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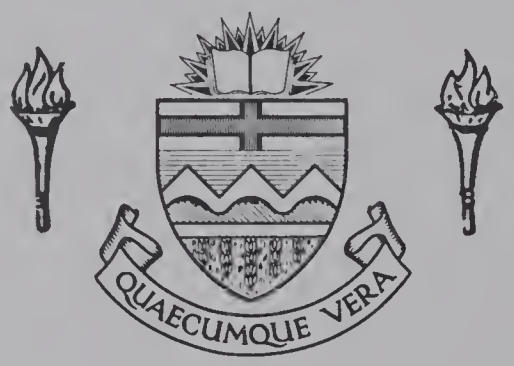

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AGRICULTURAL INNOVATIONS, COUNTY OF ST. PAUL, ALBERTA

by

© GEORGE PICH

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF ARTS

DEPARTMENT OF GEOGRAPHY

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FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled AGRICULTURAL INNOVATIONS, COUNTY OF ST. PAUL, ALBERTA submitted by George Pich in partial fulfilment of the requirements for the degree of Master of Arts.

ABSTRACT

A sample of 105 farmers who were considered, by key informants and local farmers, to be the leaders in adopting agricultural innovations recommended for the County of St. Paul, near the margin of cultivated land in northeastern Alberta, were selected for study. In this sample, comprising about eight per cent of all farmers in the county, nine farmers were most frequently cited as opinion or sanction leaders.

During personal interviews, questions were asked about the personal and farm characteristics, and the innovations adopted and proposed, by the 105 adoption leaders in their efforts to maximize output on existing cultivated land, as proposed by The B-12 Plan for the area. The personal characteristics of age and education were poorly correlated with the adoption or nonadoption of recommended farm innovations. However, there was a widespread desire for higher levels of education for the offspring of adoption leaders and for future farmers in the area. High gross income and large farm size appeared to serve, locally, as the best indices of innovative farming or successful agricultural adjustment in the area.

Maximization of output per acre has become the goal of only a minority of innovative farmers; expansion, often for the sake of expansion, appears to be the goal of the remainder. Bigness was often an end in itself and was not necessarily related to systems of maximizing output in the area. The

pattern of extensive cultivation appears likely to persist if local norms continue to equate large cultivated acreages, large numbers of livestock, and high gross income with innovative farming.

While mechanization has been diffused extensively in the area, systems of business analysis in farming have infiltrated only to a slight degree, often on the initative of money-lending institutions. Besides business procedures in farming, adoption leaders may also lag in the acceptance of other mass-society influences.

Spatially, the farming community centered on the town of St. Paul dominates the local pattern of communications between farm adoption leaders. The intensity of information-seeking contacts between farmers diminishes sharply as distance from St. Paul, or the nine sanction leaders, increases. Edmonton and Vermilion are the dominant centers in the communications network established with outside areas. Spatially, few differences exist in the rate at which agricultural innovations have been adopted on grey or black soils.

It appears that the sample of farmers can contribute significantly toward doubling production, as proposed by The B-12 Plan, because they already produce a disproportionate share of the livestock and utilize a disproportionate share of the cultivated land in the County of St. Paul. However, the art of applying technology to maximize agricultural output needs more attention in the area.

ACKNOWLEDGEMENTS

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CHAPTER I

INTRODUCTION

I. GENERAL PURPOSES OF THE STUDY

To date, the most comprehensive information on the diffusion and adoption of innovations deals with agriculture. Rural sociologists have been largely responsible for advances in research, analysis, and the furthering of empirical knowledge about adoption leaders and agricultural practices.

This study is designed to use some of the findings of accumulated research, primarily of American origin, and some Canadian evidence as well, to characterize those farmers regarded as the leaders in adopting agricultural innovations in the County of St. Paul in the Province of Alberta. These leading farmers will be termed "adoption leaders". In succeeding chapters previous research will be used comparatively to highlight the similarities and contrasts between the evidence from the County of St. Paul and the evidence provided by studies of diffusion of agricultural practices elsewhere. Also, farm practices specifically recommended for use in areas such as the County of St. Paul by agricultural advisers in the Alberta Department of Agriculture, and by other advisory agencies, will be examined. These will be used as bases for gauging the extent to which

county farmers have made, or are making, successful adjustments in their farming practices in the light of changing technology, management and economic conditions.

Social scientists have long recognized that "the adoption and dispersion of innovation is a major mechanism of social and economic change".[1] Whether such a mechanism is, or should be, operating in the County of St. Paul in order that the targets of The B-12 Plan, designed specifically for improving the area, can be achieved is worthy of examination. Successful agriculture, based on a variety of adjustments, is a major goal of this plan.

The decisions farmers make to accept or reject farming practices or adjustments have a spatial dimension. Wolpert contends that a farming population is ideally suited to a study of agricultural innovativeness "because the results and consequences of its decision behavior are more easily observable on the landscape.... The decision making in farming is dispersed spatially among many producers."[2] This study attempts to show that innovations diffuse in both a social and a spatial dimension, the spatial dimension being particularly suited to graphic representation through the use of maps.

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[1] L. Brown, Diffusion Dynamics. Lund Studies in Geography, No. 29, Series B, Human Geography, The Royal University of Lund, Sweden, 1968, p. 7.

[2] J. Wolpert, "The Decision Process in Spatial Context". A.A.A.G., Vol. 54, 1964, p. 537.

II. SPECIFIC PURPOSES OF THE STUDY

A. Characteristics of Farmers and their Operations

In this study two major categories of situational factors are investigated: (1) characteristics of the farm operator himself — his age, education, and technical agricultural training, and (2) those items that apply to the farming situation — size of farm operation, gross income, present farm economy, type of specialization and tenure status.

In addition, the individual farm operator's perceptions of future educational needs of farmers, the value he places on education for his offspring, and his perceptions of desirable future farm size and expected future needs in his livestock specialty will be examined.

B. Communication and Social Participation

This study recognizes that "the propagation and spatial diffusion of innovation is a communication process".[3] Changes or innovations are initiated by individuals, primarily as a result of a learning or persuasion process which operates in a social system. Agricultural ideas accumulate readily if well-developed formal or informal channels of communication exist within an area or with regions outside the immediate study area. This study will depict the network of communica-

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[3] Brown, op. cit., p. 23.

tions among local farmers considered to be early adopters of innovations and the network of communication or interaction developed with farmers residing outside the County of St. Paul or with others living beyond the region.

Social participation in formally structured organizations, clubs, demonstrations, workshops, or short courses is another avenue of communication that may establish desirable information-seeking relationships between farmers and non-farming personnel or agricultural advisers. Formal social participation may provide farmers with opportunities to develop, observe or imitate leadership that is essential to an agricultural community which is striving to make rapid adjustments in its agricultural practices. The degree and nature of formal social participation in the sample of farmers selected will be examined.

C. Innovations Adopted or Proposed

This study will analyze innovations that have been established in the area during two broad time periods: (1) those practices that have been long established, going back in time ten to thirty years, and (2) those practices that are of more recent origin, dating from about 1959 to the summer of 1969. Practices that have been discontinued will be examined as well. Innovations adopted or under consideration should serve as a measure of the extent to which county farmers have been innovative in the past, or can be expected to be reasonably innovative in the future in the light of

proposed changes or improvements they have considered recently.

D. Management Changes Under Consideration

The study will reveal how farmers, deemed to be the early adopters of innovations in the county, perceive management changes that are likely to improve their own farm operations. Their perceptions of the advantages in implementing certain changes will be analyzed in terms of official recommendations of professional agricultural advisers or extension workers in the Alberta Department of Agriculture or in other advisory or research capacities.

III. HYPOTHESIS

In order to synthesize the findings of this study and to present a profile of farmers considered to be early adopters of innovations in the County of St. Paul, the following hypothesis is proposed: Farm operators farming predominantly grey-wooded soils have adopted agricultural adjustments or innovations that differ from the agricultural adjustments or innovations adopted by farmers farming predominantly black soils.

A sample of farmers whose operations are located on predominantly grey-wooded soils will be contrasted with a sample of farmers located on predominantly black soils. The innovations adopted or discontinued will serve as the basis

for testing the hypothesis. Both samples will be composed of an equal number of farmers.

IV. DESCRIPTION OF THE STUDY AREA

The County of St. Paul is located northeast of Edmonton, in the southern part of Census Division 12 in the Province of Alberta (Figure 1). It is situated astride a broad transition zone that is characterized by areas of fertile soil in the southern part of the county which gradually give way to areas of decreasing fertility as one moves in a northerly direction through the county (Figure 2). The topography is shown in Figure 3. Most areas in the county are suited to mechanized agriculture. Significantly, for example, relatively large areas of fertile black soil (Figure 2) have undulating topography (Figure 3). Climatically, the frost hazard for agriculture is variable. The generalized map of the frost-free period (Figure 4) reveals the frost-risk pattern in the area. Meteorological data, however, are incomplete at a sub-regional level. There are many local variations in the frost hazard to crops within the county depending on whether cultivated land is situated on relatively high or low ground, the high ground remaining frost free for more days during the growing season because of cold air drainage toward land at lower elevations. Proximity of land to large open bodies of water in the county helps to moderate surrounding temperatures by a few degrees Fahrenheit in the vicinity

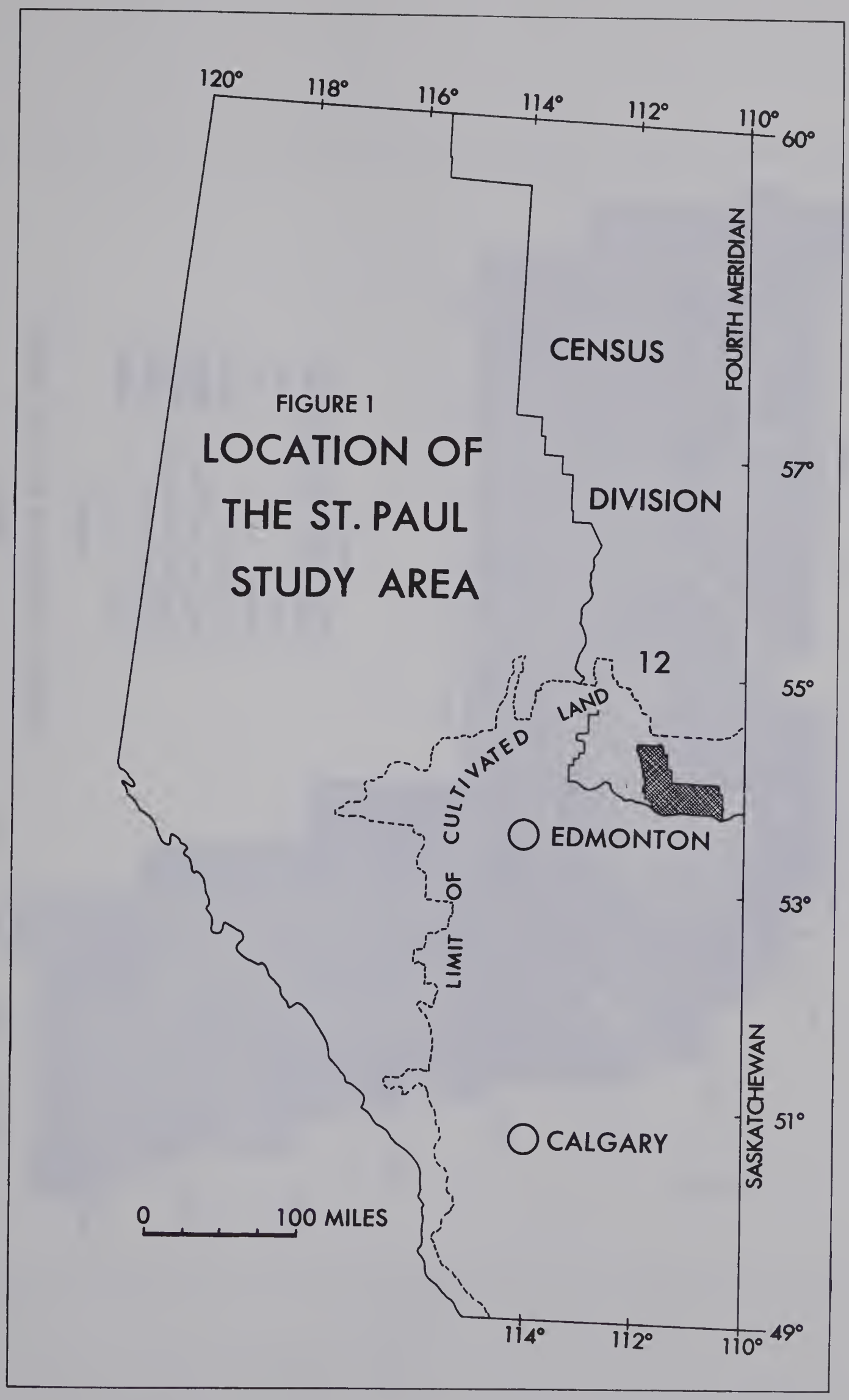
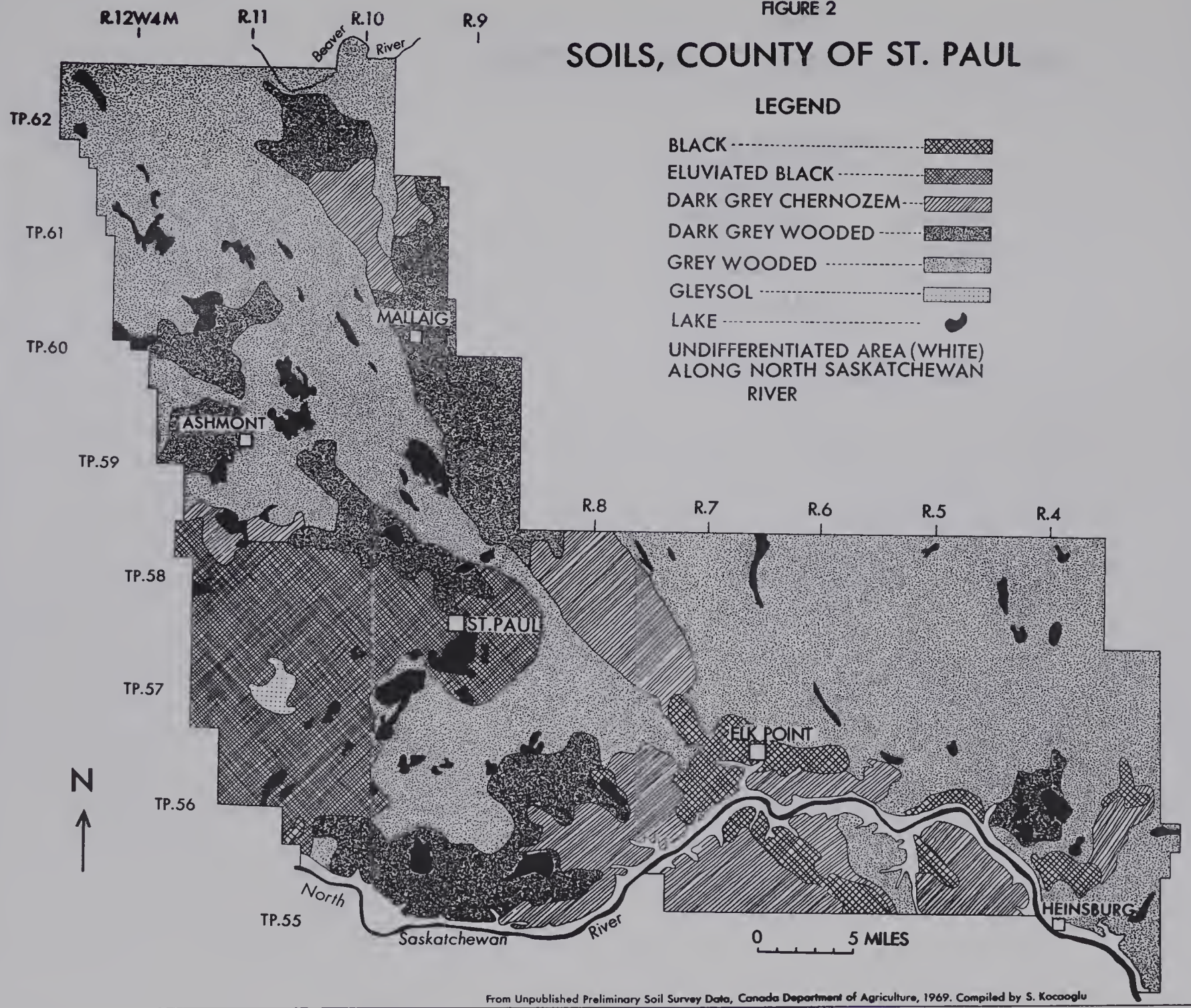


FIGURE 1

LOCATION OF THE ST. PAUL STUDY AREA

FIGURE 2

SOILS, COUNTY OF ST. PAUL



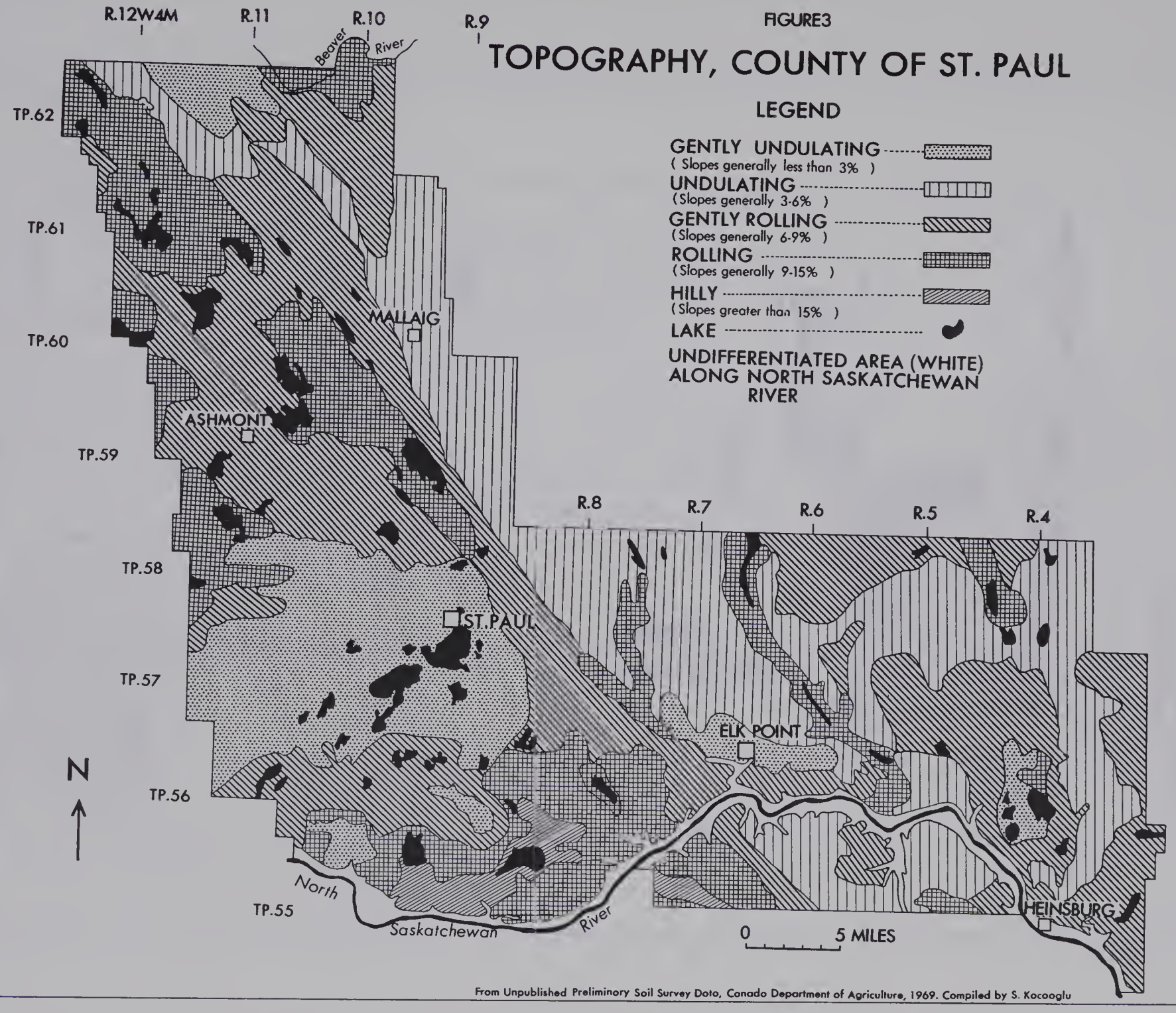
LEGEND

- BLACK
- ELUVIATED BLACK
- DARK GREY CHERNOZEM
- DARK GREY WOODED
- GREY WOODED
- GLEYSOL
- LAKE
- UNDIFFERENTIATED AREA (WHITE) ALONG NORTH SASKATCHEWAN RIVER

From Unpublished Preliminary Soil Survey Data, Canada Department of Agriculture, 1969. Compiled by S. Kocaoglu

FIGURE3

TOPOGRAPHY, COUNTY OF ST. PAUL



LEGEND

GENTLY UNDULATING
(Slopes generally less than 3%)

UNDULATING
(Slopes generally 3-6%)

GENTLY ROLLING
(Slopes generally 6-9%)

ROLLING
(Slopes generally 9-15%)

HILLY
(Slopes greater than 15%)

LAKE

UNDIFFERENTIATED AREA (WHITE) ALONG NORTH SASKATCHEWAN RIVER

From Unpublished Preliminary Soil Survey Data, Canada Department of Agriculture, 1969. Compiled by S. Kocaoglu

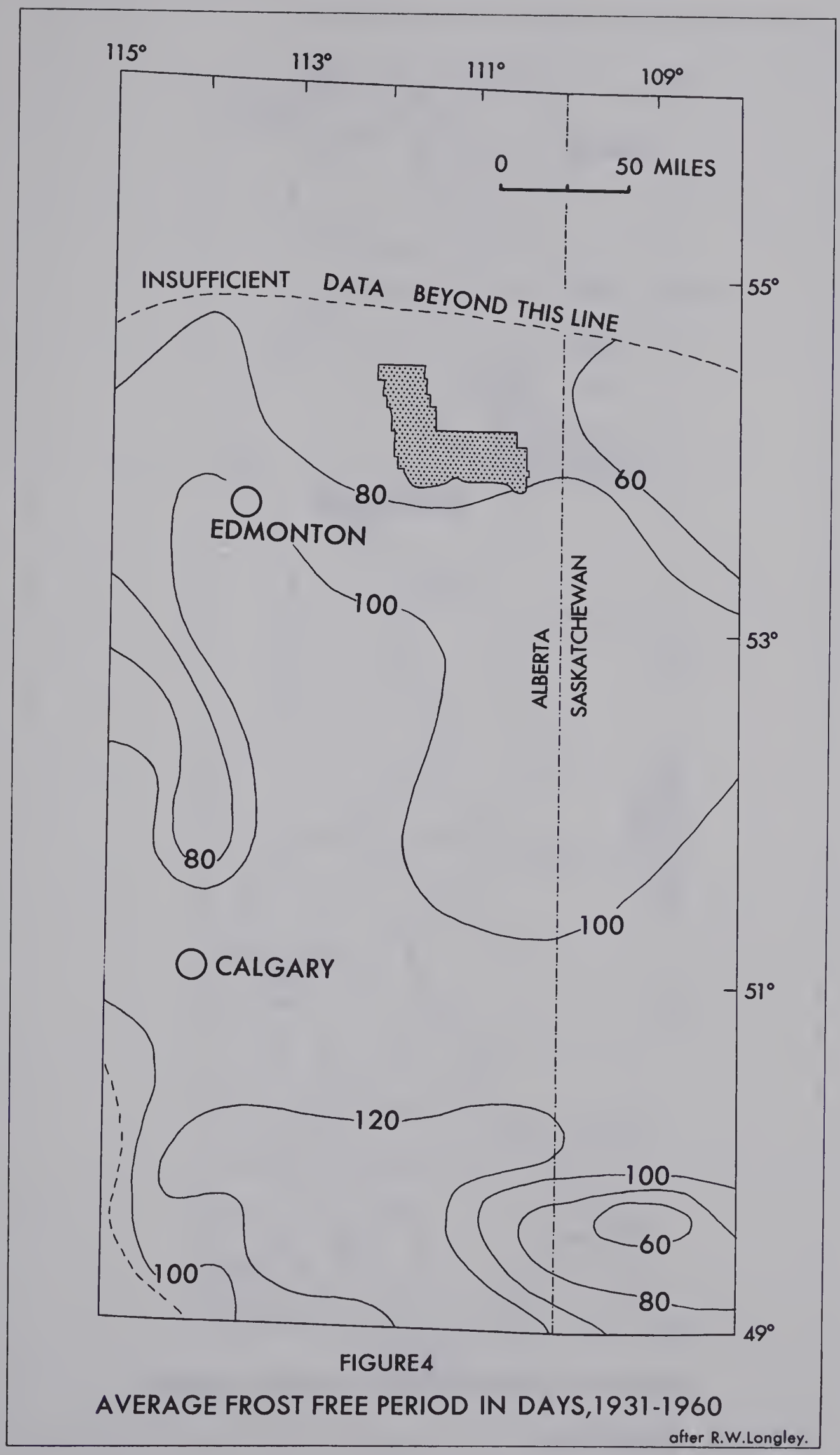


FIGURE4

AVERAGE FROST FREE PERIOD IN DAYS,1931-1960

after R.W.Longley.

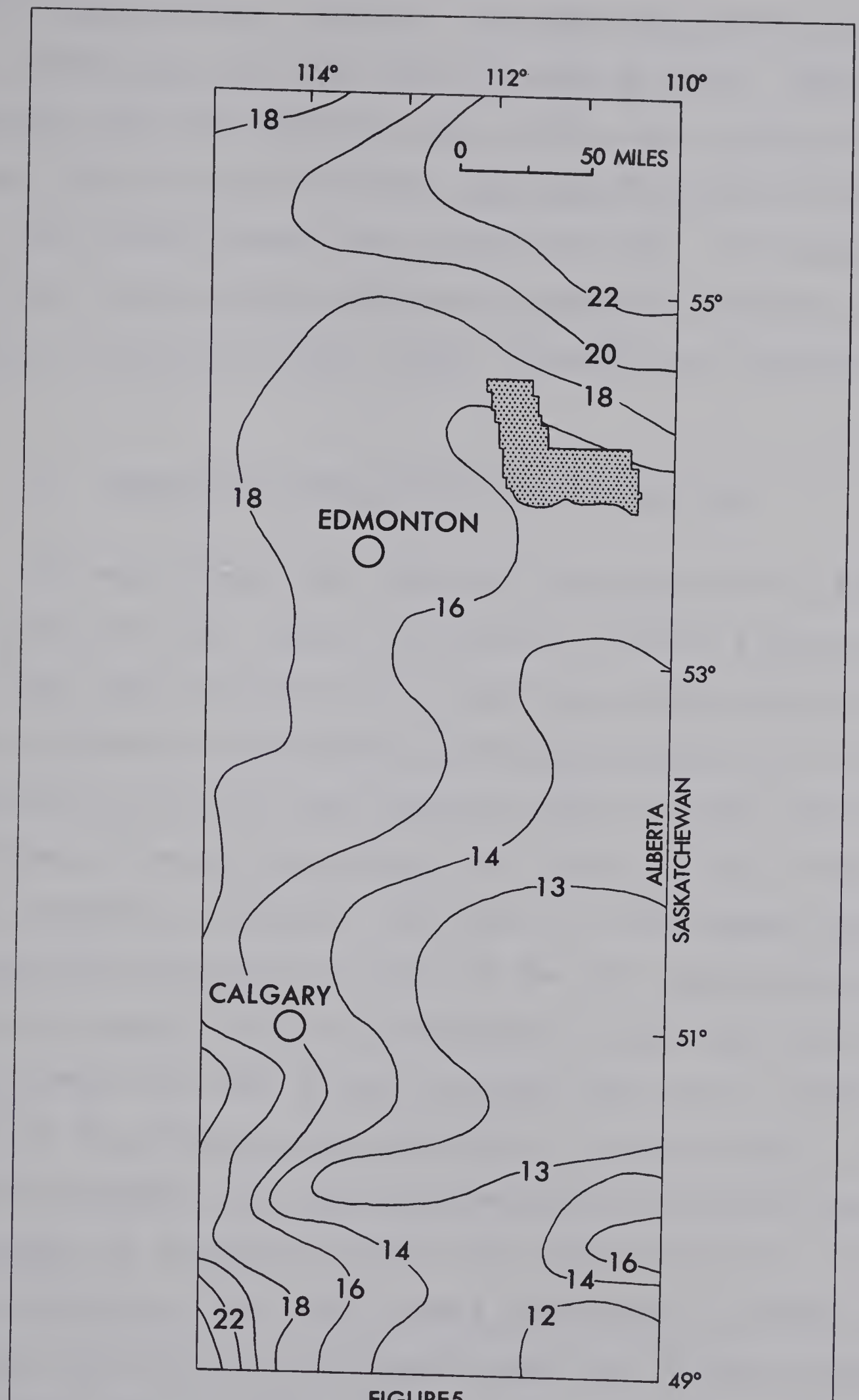


FIGURE5

NORMAL ANNUAL PRECIPITATION IN INCHES

after Alberta Farm Guide ,1967.

of the water bodies. However, the moderating effect drops off beyond about one mile from the body of water. Broadly speaking, the more favoured areas within the county can expect about ninety frost-free days and the areas of greatest frost hazard about sixty frost-free days. The amount of annual precipitation (Figure 5) generally increases from south to north within the county. Droughts are infrequent.

V. REASONS FOR SELECTION OF THE STUDY AREA

The main reason for selecting the County of St. Paul for study was that Census Division 12, of which the county is a part, had in recent years received considerable attention in federal and provincial government studies and in the news media as an area that required major economic adjustments if it was to reach the standard of living current in most other regions of Alberta. The need for a development plan to raise the standard of living of the farm and non-farm population in Census Division 12 was based on one major consideration: Census Division 12 has the lowest per capita income level of the fifteen census divisions in the province. The need for remedial and long-range measures for agricultural adjustment is attested by other well-publicized facts: (1) Census Division 12 has the largest percentage in Alberta of persons who have not gone beyond grade four in their formal schooling, and (2) Farms in Census Division 12 are on the average only two-thirds the size of the average Alberta farm.

The ways in which these handicaps, together with a relative locational or distance disadvantage (in terms of marketing farm produce) and recurring climatic hazards (mainly frost) could, in part, be overcome gave rise to questions about the ability of the area to make the necessary agricultural adjustments in order to improve its socio-economic position. The B-12 Plan for the socio-ecomonic improvement of C.D.12 indicated that "a structural change in agriculture would permit the establishment of viable farming enterprises".[4] Specifically, land consolidation and land improvement programs were proposed as measures to bring about the desired change. Increased rationalization of agriculture in C.D.12, it was hoped, would result in a greater intensity of land use in order to increase output per farm. Further, The B-12 Plan envisages accelerated mechanization as one means of replacing redundant labour on farms in the area. Implicit in the plan is the realization that greater economies of scale will result only after extensive land consolidation and improvement programs are put into effect. In order that economic benefits accrue to those farmers remaining in agricultural enterprises in the area, substantial rural depopulation is a prerequisite to the land consolidation program.

In general terms, The B-12 Plan, now in operation, seeks

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[4] Alberta Department of Agriculture, The B-12 Plan, 1968, p. 38.

to improve the productivity of farm land "through the use of fertilizers, better farm management practices, improvements in pasture and forage practices, as well as application of other intensive practices which are economically profitable for the area".[5]

Based on the socio-economic characteristics of the area and the proposals of The B-12 Plan, it appeared that a study to identify and characterize those farm operators who are most likely to survive the agricultural adjustment process in at least one part of C.D.12 was warranted. The County of St. Paul was chosen as the study area because it appeared, on the basis of a reconnaissance of its farming area during May, 1969, that the county was one of a few areas in C.D.12 that had the physical endowments and the farm operators who could adopt the required innovations in order to achieve the target proposed by The B-12 Plan. The plan proposed that "production should approximately double to achieve efficiency and economic viability in the [agricultural] industry".[6]

Secondary reasons were also important in the selection of the County of St. Paul as the study region. The writer was familiar with general agricultural practices in large areas of Northeastern Alberta but the County of St. Paul was one region with which the writer was not familiar, until the reconnaissance, mentioned above. He was unfamiliar with

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[5] Ibid., p. 70.

[6] Ibid., p. 78.

the area, its people, and its farming practices. There were thus no preconceived notions as to which farmers should be considered the early adopters of innovations in the county. Lack of familiarity with the county, it was reasoned, would more likely provide the writer with less biased insights into agricultural innovations and farmers considered locally to be early adopters of innovations.

VI. DEFINITIONS AND TERMS

There are many terms commonly used by writers who deal with the diffusion of innovations. It is recognized that meanings imparted to terms reflect the varying perspectives of their writers. The first term "innovation", is a case in point.

A. Innovation

Rogers, a rural sociologist, defines an innovation as "an idea perceived as new by the individual".[7] He does recognize that "a considerable time lag is required before an innovation reaches wide acceptance".[8] Barnett, an anthropologist, presents a more all-inclusive definition:

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[7] E.M. Rogers, Diffusion of Innovations. The Free Press, New York, 1968, p. 13.

[8] Ibid., p. 2.

> An innovation is... any thought, behaviour or thing that is new because it is qualitatively different from existing forms.... Innovation is... a comprehensive term covering all kinds of mental constructs whether they can be given sensible representation or not.9

Both definitions are applicable to this study. An innovation which represents a qualitative change is one which necessitates a departure in form, function, effort, manipulative skill or management from existing practices. Thus, the adoption of soil testing to determine the exact chemical deficiencies of certain soils in order to maximize crop yields would constitute a qualitative change from a previous practice of varying the "quantitative" application of commercial fertilizer on a trial-and-error basis.

B. Diffusion

Diffusion is

> the process by which an innovation spreads. The diffusion process is the spread of a new idea from its source of invention or creation to its ultimate users or adopters.... The essence of the diffusion process is the human interaction in which one person communicates a new idea to another person.10

Students of diffusion have long recognized that there is a considerable time lag between the original adoption of an innovation in an area and subsequent adoptions. There is considerable evidence from geographic research that the rate

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[9] H.G. Barnett, Innovation, The Basis of Cultural Change. McGraw-Hill Book Company, Toronto, 1953, p. 7.

[10] Rogers, op. cit., p. 13

or intensity of diffusion drops off considerably as distance increases from a center of innovation.[11] A center of innovation may be a dominant urban center like Edmonton or an agricultural service center like St. Paul in the study area. The relative remoteness or isolation of the study area from Edmonton, with its institutional facilities for disseminating information about agricultural innovations, should, in theory, serve to retard the diffusion of innovations. At the local level, the rate or intensity of diffusion, in theory, is a function of distance from the dominant center, St. Paul. In Chapter III this phenomenon will be examined in conjunction with Figure 8 which deals with information-seeking relationships or contacts in the county.

C. Adopters and Rejectors

Adopters and rejectors of innovations are "not a dichotomy.... No one is wholly or persistently an acceptor or a rejector. He is simply more or less so than somebody else and with reference to a specific idea."[12]

D. Sanction Leadership and Legitimation

Legitimation by the sanction leaders is the process by which the influence, prestige, power or coercion of an in-

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[11] See P. Haggett, Locational Analysis in Human Geography. Edward Arnold Publishers, London, 1965, pp. 56-60.

[12] Barnett, op. cit., p. 380.

dividual or a group is brought to bear on individuals adopting innovations that may or may not be in keeping with the expectations of the sanction leaders. Often the sanctioning or legitimizing of certain practices in an agricultural community is much more subtle than overt; it may be only weakly developed or may be operating in a relatively small circle of farmers. The legitimation may be done by a small number of farmers but it spreads through the whole community.

E. Opinion Leaders

Opinion leaders are those individuals from whom farmers seek information or advice. Opinion leaders may be non-farmers. However, the distinction between opinion and sanction leadership cannot always be clearly shown, and an individual farmer may possess characteristics of both of these dimensions of leadership.

F. Adopter Categories

Innovators, according to numerous findings are "in, but not of", their farming community. While the majority of farmers, laggards and even many early adopters tend to look inward to their farming community and to adhere to local norms or values, the innovator with his more pronounced cosmopolitan, outward orientation may be only slightly affected by or indifferent to local expectations and the influence of local sanction leaders. Too little may be known about the innovator locally. His "community" may be too broad and his frame

of reference too alien, even to local, knowledgeable professional agricultural personnel.

Adopter categories, as defined by Rogers, are "the classifications of individuals in a social system on the basis of innovativeness".[13] In Rogers' arbitrary scheme, the top 2.5 per cent of any occupational group are considered "innovators" while those immediately below them, comprising 13.5 per cent of a population are referred to as "early adopters". Because this study sets out to examine the personal and farm characteristics and the innovations adopted or proposed by the top farmers in the County of St. Paul, the two categories, innovators and early adopters, will be combined and referred to by the general term "adoption leaders". The reason for this is that, strictly speaking, it is quite conceivable that the study area may in fact have few or no farm innovators present. It is felt that by incorporating a wider spectrum of farmers into the sample, a clearer picture of practices adopted by the top farmers will emerge.

VII. BRIEF AGRICULTURAL HISTORY

The agricultural history of the study area began in 1896 with the largely futile attempts of Roman Catholic missionaries to introduce the Metis population to an agricultural way of life. The colony of St. Paul des Metis,

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[13] Rogers, op. cit., p. 148.

centered on the present-day town of St. Paul, was opened during that year and had at its disposal two townships of land which could be sublet to the Metis "in lots of eighty acres at a nominal fee".[14]

When it became apparent that the Metis were not meeting the hopes of their missionary promoters in becoming proficient agriculturalists, the Church requested that the St. Paul des Metis colony be open to settlement by white farmers. Although a few southern parts of the study area were settled by white farmers shortly after 1905, the large influx of white, mostly French-Canadian settlers, began with the issuance by the government of homesteads on lands within the original two townships which were unoccupied by the Metis, and on adjoining lands in the area.

Mixed farming, geared primarily to the subsistence needs of the white homesteaders and to the village population in St. Paul des Metis, was the usual practice. Few outlets to outside markets were available, the nearest railway being located 65 to 70 miles west of the settlement. Markets south of the North Saskatchewan River were difficult to reach. Off-farm employment was crucial to the survival of the farming settlement during its early years. With the extension of the railway to St. Paul des Metis in 1920, self-sufficiency gradually gave way to commercial mixed farming

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[14] L.H. Drouin (ed.), History of St. Paul, Alberta, 1909-1959. St. Paul Journal, St. Paul, Alberta, 1960, p. 5.

and a more permanent year-round farm-employment pattern.

Other ethnic groups followed the French, primarily after World War I, making the total population of the study area more heterogeneous. Today, ethnic distinctiveness in life styles and farming practices appears to be minimal. Intermarriage between ethnic groups and the identifications local people form on the basis of occupation, religious affiliation or other sociological factors are rapidly erasing the initially more prominent ethnic loyalties. For these reasons, a tally of the population based on lineage is difficult. Roughly, sixty per cent of the county population is French, twenty per cent Ukrainian, and twenty per cent is composed of Anglo-Saxon, Scandinavian, and other groups.

More important in understanding the lag of this region behind more prosperous farming regions of Alberta is an appreciation of the scanty resources with which many farmers entered the county. The inertia of minimal education among most ethnic groups, high illiteracy rates among some groups such as the Ukrainian homesteaders, lack of favourable physical assets (primarily soil and climate), lack of capital resources for many farmers, and the rehabilitation of soldiers, usually with few assets, following both World Wars, have contributed to the region's slower rate of agricultural progress. However, these are average conditions for the county. Further, inclusion of the County of St. Paul in the agricultural statistics of a region as extensive as C.D.12 creates

an unrealistic picture of the county being "twenty years behind the times", since agricultural progress in many of the other sub-regions, mainly north of St. Paul, has been thwarted by the inertia induced by even more unfavourable human and physical characteristics.

The initial advantages in settling the parkland regions of fertile chernozemic soils within the County of St. Paul were soon offset by the burden of clearing the forest from the transitional and grey-wooded soils and creating viable economic units on these soils. Moreover, the upward climb for all farmers within the county to compete favourably with large-scale farmers in more southerly regions who experienced fewer initial disadvantages in establishing commercial enterprises, has been a major barrier in closing the gap between the two.

VIII. SELECTION OF THE SAMPLE

A. Method of Selecting the Sample

In order to identify those farm operators who were considered to be innovators or early adopters of agricultural innovations in the County of St. Paul, and hence most likely to be able to improve the agricultural economy of the area as well as their own operations, the following procedure was followed:

(1) Key informants or community knowledgeables who were familiar with farmers and farming practices in the

County of St. Paul were contacted individually during May, 1969 to name those farmers whom they considered to be the county leaders in adopting new or improved farm practices and ideas. The district agriculturalist, the agricultural fieldman and the assistant resource development coordinator were provided with a land ownership map of the county to guide them in their selection. The writer recorded the names of the farmers who were mentioned. The district agriculturalist named seventy farmers, the agricultural fieldman eighty-one farmers, and the assistant resource development coordinator suggested seventy-two names.

(2) As the use of commercial fertilizer is considered to be a significant indicator of a farmer's desire to maximize or intensify production on his land, fertilizer retailers in the County of St. Paul were also contacted. They were asked to name those of their farm customers who had, over the years, used commercial fertilizers most consistently on most of their cultivated acreage. Seventy-one farmers were mentioned by fertilizer retailers. When steps 2 and 3 were completed, 178 farmers were mentioned as adoption leaders.

(3) It was decided that once a farmer had been mentioned at least twice by the above key informants and fertilizer dealers, he would be entered on the list of farmers who would be interviewed later during the summer. The list of farmers mentioned two or more times comprised 100.

(4) It was also decided that if the farmers in the original sample mentioned additional farmers who were not

considered adoption leaders by the key informants, these farmers would also be entered on the list of farmers to be interviewed, provided they were mentioned two or more times. Five additional farmers were eventually added to the list of 100 in this way, raising the final sample to 105.

(5) In order to qualify for inclusion in the sample a farmer had to be farming some land within the County of St. Paul. Farmers who would normally be considered by their fellow farmers as local farmers but who in fact were farming in a neighbouring county or municipal district were excluded from the sample. Three farmers were excluded from the sample because of these requirements even though they were designated adoption leaders by two or more farmers in the County of St. Paul.

(6) In addition, eight retired or semi-retired farmers were contacted in order to obtain general insight into the historical evolution of farming, settlement, and social changes in the County of St. Paul. Three other farm operators were interviewed in the usual manner but since they were neither designated by the key informants nor by other farmers as adoption leaders, the information they supplied was not compiled with the data obtained from the sample of 105.

B. Shortcomings of the Sampling Method

There was a discrepancy between the list of farmers who were considered by key informants and fertilizer retailers to be adoption leaders in the county and the list of farmers

designated as adoption or opinion leaders by the farmers themselves. The key informants and fertilizer retailers were unanimous in selecting only twenty-four farmers in the original sample of 178. The final sample of 105 farmers collectively mentioned 125 other farmers as opinion leaders in the county. On the average, then, each farmer designated 1.2 other farmers as adoption or opinion leaders. In the sample, fifty-seven farmers were mentioned only once, while twenty-one were mentioned two or more times. Twenty-seven farmers were isolates in that they neither mentioned other farmers nor were they mentioned by others. Even though key informants and fertilizer dealers mentioned these twenty-seven, farmers did not. Had the sample been based on a sociogram of choices made by the 105 farmers alone, only twenty-one farmers would have been interviewed. These 105 farmers, however, are only a fraction of the 1,272 farmers[15] in the county. Undoubtedly, a sociogram of all farmers in the county would produce a different picture of adoption or opinion leadership. In the sample of farmers interviewed, the number of mentions by other farmers ranged from two, for farmers just qualifying for inclusion in the sample, to seventeen for the farmer considered the top adoption or opinion leader. Sixty farmers in the sample received no mention whatever as adoption leaders by other farmers in the sample.

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[15] Dominion Bureau of Statistics, 1966 Census of Canada, Agriculture, Alberta, Ottawa, 1966, p. 27.

It must be recognized that since farmers in the study sample generally mentioned only 1.2 other farmers whom they considered adoption leaders, they could not be expected to be familiar with more than a fraction of the adoption leaders and innovations in the county. Lack of familiarity with county farmers was also generally the case with fertilizer retailers who knew their most consistent local fertilizer users best, but otherwise had little or no knowledge about farmers further afield in the county or in the trading area of a fertilizer dealer in another center, within or outside the County of St. Paul. On the other hand, the district agriculturalist, the agricultural fieldman, and the assistant resource development coordinator had much broader familiarity with county farmers and farming practices because of their more frequent contacts with farmers throughout the county. In addition, it is possible that in some cases the key informants who selected the study sample may have consciously or subconsciously considered innovativeness and evidence of conspicuous spending on material farm possessions as synonymous entities.

IX. METHOD OF FIELD RESEARCH

Data for the purposes of this study were obtained by means of personal interviews employing a questionnaire (Appendix). Answers to open-ended questions were recorded as nearly verbatim as possible, usually in the presence of

the farmer, but occasionally soon after the conclusion of the interview if it was felt that the flow of communication was being hampered by immediate recording of responses.

The writer attempted to see as many innovations as possible whenever they were accessible. Mechanical innovations and innovations in hog, beef and dairy enterprises were the easiest to identify. Evidence of cultivation practices could usually be observed from the roadside, at least on the land on which the farmer resided. Trash cover cultivation is one example.

Often it was necessary to direct the responses of farmers to a discussion of the advantages they perceived in accepting, rejecting, or planning for the adoption of innovations. During some interviews, farmers no longer perceived desirable farming practices as innovative. Some innovations had been so long established they were perceived instead to be common, routine, necessary practices. The use for many years of a deep tillage cultivator, a grass-legume rotation or commercial fertilizer are such examples. By contrast, farmers had a tendency to readily recall and perceive the advantages of using rather recently adopted and anticipated innovations.

CHAPTER II

SELECTED CHARACTERISTICS OF ADOPTION LEADERS AND THEIR FARM OPERATIONS

Studies of the diffusion of innovations, whether focusing on innovativeness on a broad cultural level or on the level of a particular facet of culture such as agriculture, have increasingly stressed the role of the personal qualities of the entrepreneur as a vital factor of production. The personal qualities of the top farm operators in the County of St. Paul may in fact overshadow the influence and importance of the physical limitations of the area for agriculture. Age of the farm operators, their levels of educational attainment and the value they ascribe to education for their offspring and to prospective farmers in the area were examined. Such factors as farm operators' gross income, the present and the perceived optimal or desirable farm size, and type of farm economy for the area were also investigated.

I. AGE AND DECISION-MAKING ARRANGEMENTS

A. The Local Farm Sample

Of the 105 farm operations in the study sample, there were 91 full-time farm operators who managed their farms as single proprietorships. These 91 operations were considered single proprietorships because farm management decisions were

made essentially by the proprietor himself, even though other members of the family contributed to the farm operations in a largely non-decision making capacity. The single proprietors ranged in age from 25 to 63 years, the average age being 44 years.

Fourteen farm operations were classified as partnerships, ranging from two-way, father-and-son partnerships to a five-way partnership of father and sons. The average age of operators who managed their farms as verbal or legal partnerships was 39 years. In the case of the fourteen partnerships, not all partners were engaged in the farm enterprise full time. Twenty-nine of the partners devoted their full-time efforts to farming while six of the partners occasionally contributed their labour to the farm or served as important sources of supplementary capital for the operation and hence as participants in the decision-making process on the farm.

Eleven sons of farmers operating single proprietorships also assisted in farming enterprises on a full-time basis. Their average age was twenty years. Whether the young farming assistants will long remain interested in farming if they do not become a significant part of the decision-making process on their respective farms is open to conjecture. If they have an opportunity to accumulate farm assets or to obtain outright ownership of at least a part of their father's land, livestock, machinery or equipment, they may comprise a group of possible successors to the existing decision makers.

Even though the average age of single proprietorship farm operators and the age of farming partners is still relatively low, the prospect of few replacements for the existing top decision makers may give rise to a changed farm management situation within the next decade or two. A pronounced trend toward less labour intensive farming practices may materialize quickly if successors to present operators are few.

B. Relation of Previous Research on Age to the Study Area

If, in reality, young farm operators are less conditioned by the older culture of their parents and elders and are therefore more innovative as Rogers[1] suggests, they would likely make the kind of adjustments necessary to operate viable, efficient farm units. This would come about despite the prospects of a greatly diminished labour force in the study area. Lionberger has found that "the needs of the older farmer are somewhat different than those of younger men, and receptivity to new ideas may be directly related to how well they fit the needs of declining years and physical energies".[2] He further points out that young farmers who may desire to make changes in farming are not always in a posi-

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[1] E.M. Rogers, Diffusion of Innovations. The Free Press, New York, 1968, pp. 172-174.

[2] H.F. Lionberger, Adoption of New Ideas and Practices. The Iowa State University Press, Ames, Iowa, 1960, p. 17.

tion to do so because of capital restrictions or because final decisions may rest with the money-lender or with the person who owns the farm.[3] Wilkening also recognizes the frustrations of aspiring young farmers for "it is significant that younger persons do not accept new ideas when they are under the close control of parents and are dependent on them".[4]

In the study area, some of the young farm operators indicated that they were reluctant to implement significant departures from existing local farm practices. They were expected to show deference to older farmers, usually their fathers, whose extensive practical experience and hence assumed wisdom were to serve as reliable guidelines to proposed changes. However, this feeling appeared to be a minority view. Most operators below the age of forty realized that the future directions of agriculture would be their responsibility. Deference to age was probably not as significant in the area as was the recognition that farmers who were successful for a few decades should be consulted because of their technological and managerial competence and ability "to make money at farming". It was generally recognized by the young and aspiring farmers that they should

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[3] Ibid., p. 96.

[4] E.A. Wilkening, "The Process of Acceptance of Technological Innovations in Rural Society", in A.L. Bertrand (Ed.), Rural Sociology. Toronto, 1958, p. 397.

eventually serve as mutual models. They would be taking greater risks and attempting changes whereas the older farmers could continue to exist comfortably with lower degrees of risk taking.

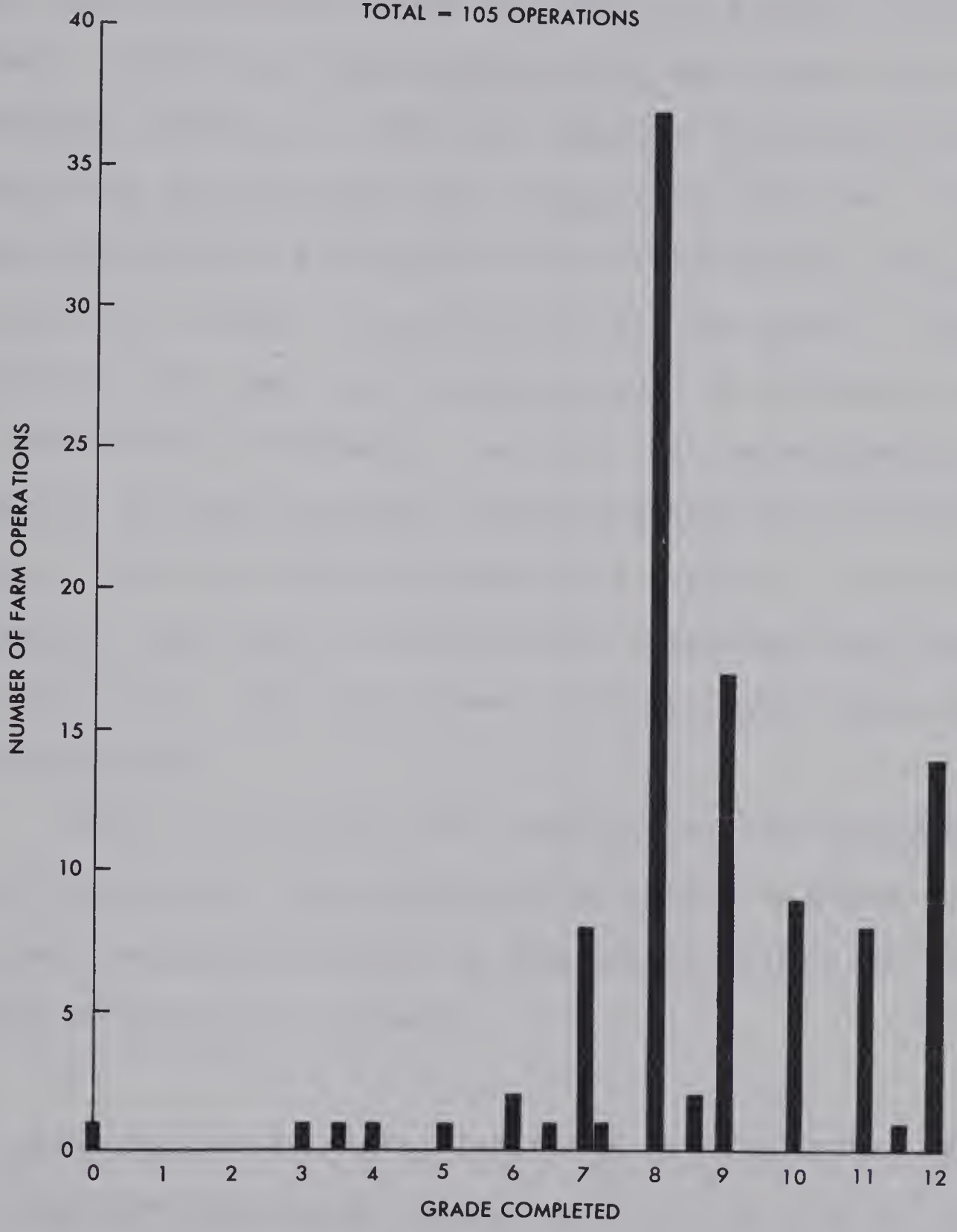
II. EDUCATION

The adoption leaders in the County of St. Paul completed an average of 8.8 grades of formal schooling. Figure 6 reveals the distribution of grades completed by the study sample. Few full or part-time farmers, however, have obtained additional training beyond formal, compulsory schooling. Two operators, one farming part time and the other full time, have received a total of six years of university training, none of it in agriculture. Eight farm operators have obtained a combined total of sixteen years of agricultural training at a school of agriculture. One farmer has completed four years of commercial and business training while four others have received a combined total of seven years of training in fields such as surveying, sheet metal work, welding and agricultural mechanics.

A. Operators' Perceptions of the Value of Education

While relatively few of the early adopters of farm innovations have themselves obtained post grade-school education, they generally endorsed a need for a higher level of educational attainment for future farmers in the area and for

FIGURE 6
AVERAGE GRADE COMPLETED IN SCHOOL FOR EACH OPERATION



their own offspring. This expectation applied whether they intended to remain in farming or intended to train for non-farming employment.

Ten farmers felt that an incomplete high school education would adequately serve the needs of farmers in the future. Eighty-one farm operators (single proprietors and partners) perceived a need for complete high school training. Sixty-five of the eighty-one recognizing this need, suggested that additional training in a university faculty of agriculture or a school of agriculture was desirable. Three operators felt that short courses would keep farmers abreast of innovations in farming; one felt that veterinary training would be an asset, and one valued bookkeeping training. Nine farmers indicated that they were not certain, or could not perceive, what level of educational attainment was desirable in the future. Only one farmer indicated that education was not important.

Table 1 indicates those reasons commonly cited as a justification for the additional education required by farmers in the foreseeable future, or the justification for no additional training for farmers.

B. Education of Offspring Intending to Farm or Now in Off-Farm Employment

The level of educational attainment for male offspring who had left school recently and who are possible successors to the present operators averaged 11.2 grades. Offspring

TABLE 1 - REASONS CITED FOR REQUIRING ADDITIONAL EDUCATION IN THE FUTURE

	Reasons for Additional Education	Number of Farmers
1.	To understand farming and technical trends, and farming literature; to keep abreast of innovations and specialization	53
2.	To improve management or efficiency and to solve farming problems; to make farming more profitable	50
3.	To keep better records and accounts	28
4.	To complement practical experience gained in farming	11
5.	To facilitate rational short-term or long-term agricultural adjustments	6
	Other Responses	
6.	"Own experience, interest, and common sense" is still the best teacher in farming, in spite of formal education	12
7.	No response, puzzled by question; not certain why or unable or unwilling to formulate a reason; indicate that education "won't hurt" but didn't elaborate	10
8.	Other responses cited	8
	TOTAL	178*

*The total exceeds 105 because some farmers suggested more than one reason, while the 10 offering no reasons were included in the total as well.

still attending school were not included in this sample. Of the eleven male offspring who completed their formal schooling and who intended to farm, two had received a total of four years of agricultural school training while one was completing four years of university training in biochemistry. Seven of the eleven sons were definitely intending to farm but four were uncertain about their future in farming, depending on how soon they could achieve some independence in decision making. If the latter four could be assured of sufficient capital and parental assistance to participate in a partnership or in establishing single proprietorships, they would prefer to remain in farming. There was only one indication from the adoption leaders interviewed that a daughter (still a student) intended to remain in farming by choice, rather than by chance marriage to a farmer.

While only one university-trained son in the farm sample interviewed was planning a farming career, twelve other sons and ten daughters of the farm operators had graduated from universities. Six sons and daughters received business and commercial training (including clerical, bookkeeping, stenographic, and sales training). Thirteen sons received either technical school or school of agriculture training but were not farming, having gone into agribusiness or other urban employment. Two daughters were similarly placed. Fourteen sons and three daughters of the sample interviewed still remain unskilled in non-farm employment. In total, then, sixty sons and daughters have left their family farms in

recent years for non-farm employment; eleven would prefer to remain.

C. Analysis of Value Placed on Education as Revealed by Study Sample and Previous Research

Many farmers in the sample indicated that while they were not opposed to advanced education for future farmers or for their offspring, they were not actively encouraging a farming career for their children because post grade-school education would ensure greater economic security and the benefits of urban employment and living for their children. There may be a prevalent value in the county which suggests that university education and other specialized training is desirable but not if one intends to farm. That only one of twenty-three recent university graduates intends to farm appears to bear this out. Even a few sons specifically trained in agriculture had no intention of farming. If such a value exists, then it could have significant implications for the future agricultural viability of the area.

Table 2 shows the perceptions that two groups of farmers, those with relatively low education and those with relatively high education, have regarding the future educational requirements of farmers in the area. While a higher percentage of those with seven years of schooling or less felt that an incomplete high school education was desirable for future farmers in the St. Paul area, a smaller percentage, with ten years of schooling or more, felt that an incomplete

TABLE 2 - DIFFERENCES BETWEEN FARMERS WITH HIGH AND LOW EDUCATION IN THE KIND OF EDUCATION THEY THINK FUTURE FARMERS IN THE ST. PAUL AREA WILL NEED

Grades Completed in School	Number of Farmers in Sample	Farmers in Each Group who Indicated that the Following are Desirable: A. Incomplete High School		B. Complete High School		C. University or School of Agriculture	
		Number of Farmers	%	Number of Farmers	%	Number of Farmers	%
7 or less	16	3	18.7	11	68.7	6	37.5
10 or more	32	2	6.2	26	81.2	28	58.3

high school education was sufficient. The group of farmers with ten or more years of schooling also perceived a greater need for a complete high school education, followed by education in a university or school of agriculture.

The findings on education in this study mirror in some respects the findings of a previous Alberta study conducted by the Farmers' Union and Cooperative Development Association in 1964. That study, surveying a much larger sample and a broader spectrum of Alberta farmers, revealed that

> Only 8% [of farmers were] satisfied to have their children reach the education level which most of them have reached (below grade 12). 66% [were] satisfied with grade 12. 15% wished for more specialized education either in special technical schools (agriculture or other) or in university.[5]

Formal schooling, albeit important, is only one aspect of the process by which early adopters of innovations learn of new farm techniques and ideas. Rogers reports that several studies reveal that certain mental qualities, abilities or attitudes are equally, if not more important, than formal training. He has found that "earlier adopters are less dogmatic, less rigid, and more rational [and venturesome] than later adopters".[6] If this finding is true, the relationship between years of formal schooling and the rate at which farmers adopt innovations "is likely to be indirect, except

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[5] L.B. Doscher, (research consultant), Survey on Farmers' Attitudes. Farmers' Union and Co-operative Development Association, Edmonton, 1964, p. 35.

[6] Rogers, op. cit., p. 178.

in cases where persons specifically learn about new practices in school".[7]

Figure 6 indicates that the largest single group of farmers in the sample had completed a grade eight education (37 of 105). Even though this evidence may indicate that, until recent decades, a grade eight education was the highest level of schooling that could be achieved in local schools within the county, the preponderance of farmers in or near this grade-eight category may reflect the values revealed in Lionberger's observation:

> While generally sharing the basic belief that education can cure most ills of society, farmers have not always felt that schooling beyond the eighth grade is needed for farming. One view is that too much schooling is useless or even detrimental because it makes a person impractical.[8]

A study by Lionberger and Coughenour elaborated on the above observation, thus:

> ...it is possible for differences in education to inhibit contact between people. A well educated farmer possesses a fund of experience which his neighbours with less education may not be able to appreciate. Frequently his interests and approach to farm problems are so different that other farmers find him odd, lofty, or abstract in his analysis of these problems.[9]

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[7] Lionberger, op. cit., p. 97.

[8] Ibid.

[9] H.F. Lionberger and C.M. Coughenour, Social Structure and Diffusion of Farm Information. University of Missouri, Research Bulletin No. 631, Columbia, Missouri, 1957, p. 67.

It was difficult to determine to what extent the above attitudes have pervaded the thinking of the adoption leaders, or of the farmers in the county generally. Most of the farmers in the sample appeared to have a very favourable attitude towards education and generally indicated that education was a prerequisite for success in most occupations, including farming. It may be, however, that in private contacts with each other some farmers in the sample may decry the value of too much "book learning" or "farming with a pencil", as implied in the quotations cited above. A mere handful of farmers hinted that academic failure in school by their sons would not prevent these sons from becoming successful as farmers or from acquiring a deep interest in farming as a career.

III. GROSS INCOME

A. Income Distribution

One hundred and four farm operations reported their gross incomes for 1968. One farmer who moved into the study area in 1969 could report no yearly income. Farm and off-farm income of single-farmer operations and partnerships were reported together as gross income. The gross income for the 104 operations was distributed as follows: 46 earned over $20,000; 13 between $17,000 and $20,000; 13 between $14,000 and $17,000; 18 between $11,000 and $14,000; 9 between $8,000 and $11,000; 4 between $5,000 and $8,000; and

one between $3,000 and $5,000.

Four of the farm operations designated as single proprietorships reported regular supplementary sources of income from either off-farm employment, from businesses owned by the operator, or from investments in non-agricultural enterprises. All four had gross incomes for 1968 in excess of $20,000. Farm operations classed as partnerships (a total of fourteen) received supplementary income from the regular off-farm employment of six of a total of thirty-five farmers cooperating as farming partners. Eleven of the fourteen partnerships received gross incomes of over $20,000 from farm and off-farm sources. The income of farmers who belonged to grain drying syndicates, or who owned their own mobile grain harvesting, drying and crushing equipment which was often hired by local farmers for custom work, was difficult to determine.

Ten farm operations, then, received supplementary income from off-farm employment, custom work, business or other investments. Such additional sources of income were commonly a significant source of capital for modernizing or enlarging the farm operations or for maximizing production on farms. All farms in the sample can be termed "commercial farms" considering that in 1966 the Dominion Bureau of Statistics defined a commercial farm as one with value of sales of agricultural products amounting to $2,500 or more. Gross income derived from commercial farms may not be the best measure of successful agricultural adjustment or via-

bility in the study area. Yet, considering the inadequacy of most of the farm accounts and farm-business analysis (to be discussed later in Chapters IV and V) in the area, gross income was selected as one of the most realistic measures available.

B. Relevance of Previous Research on Farm Income to the Study Sample

There is sufficient evidence from agricultural and non-agricultural industries to indicate that high gross income alone is no indicator of a high degree of managerial ability, farming efficiency, or assurance of a high standard of living for the farm operator and his family. High gross income is often "taken as a symbol of a farm operator's success in farming... [or it may represent] a technically competent source of information".[10] There is a much greater likelihood that a favourable financial position for a farm operation signifies the prior early adoption of improved farm practices than does an unfavourable financial position, according to Rogers.[11] "Some new ideas are costly to adopt and require large initial outlays of capital."[12] If the productivity of the farm is the basic source of capital for

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[10] Ibid., pp. 57-60.

[11] Rogers, op. cit., pp. 175-176.

[12] Ibid., p. 176.

innovations, the likelihood exists that high income and innovativeness are interrelated. Moreover, Rogers says, "while agricultural innovators tend to be wealthy, there are many rich farmers who are not innovators".[13] However, according to Lionberger, farm income is an important situational factor in the diffusion of innovations for "high farm income nearly always is associated with high farm practice adoption levels. A reciprocal cause-and-effect relationship is likely".[14] The statement is reasonable, but the cause-and-effect relationships of income and innovativeness are often difficult to discern in the absence of a detailed history of each farm operation and operator and the general inadequacy of farm-business analysis in the study area.

IV. FARM SIZE AND TENURE

In the sample of 105 farm operations, 104 operations utilized improved land, namely, land under crops, in improved pasture, or in summerfallow. One operator, an apiarist, farmed no improved acreage. He was known by three key informants and by some local farmers and regarded as an important source of information on bee-keeping and legumes, hence his inclusion in the sample.

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[13] Ibid.

[14] Lionberger, op. cit., p. 100.

A. Land Owned

The 104 operators who owned land utilized a total of 69,232 acres, or an average of 666 acres per operator. Additionally, 88 of the 104 operators utilized, to varying extents, 30,408 acres of unimproved land which they owned, an average of 346 acres per farm operation. A substantial portion of the unimproved acreage consisted of woodland, lakes, sloughs, grey wooded soils and some muskeg, or land too rough, stony, or dissected (especially near major streams or tributaries leading to them) to be of much value except for rough grazing or browsing for cattle. Three farmers owned no unimproved land, while thirteen owned 4,315 unimproved acres of land and water which were left largely unutilized, an average of 332 acres per farm operation. Thus the 104 farm operations comprised a total of 103,955 acres of improved and unimproved land, an average of nearly 1000 acres per operation.

B. Land Rented

Forty of the 104 farm operations utilized 13,915 improved acres of rented land ranging from 60 to 2,575 acres per operation, an average of 348 acres per operation. Ten of 42 operations renting land utilized 2,950 acres of unimproved land, primarily for grazing. In total, then, 10,865 acres of improved and unimproved land was rented from other farmers in the county, an average of 402 acres per operation for the 42 operations involved. In addition, 29 farmers had

access to grazing leases (almost all exclusively unimproved land) varying between 160 and 22,000 acres. These grazing leases, scattered throughout the county and extending into neighbouring areas, were lands controlled primarily by grazing associations, private leaseholders, the County of St. Paul, and landholding companies like Marathon Realty (Canadian Pacific Railway) or were crown lands. The St. Paul Grazing Reserve (shown in Figure 8), a community pasture just becoming operational during the summer of 1969, is largely an improved pasture which will contribute to the grazing capability of land within the county.

C. Assessment of Present Landholding System and Future Prospects

Figure 7 reveals the distribution of the total improved acreage, owned and rented, by the sample of 104 landholders in the County of St. Paul. The 104 landholders who comprise 8.2 per cent of farmers in the county, according to 1966 Dominion Bureau of Statistics figures, control 82,987 acres of the total of 351,201 improved acres[15] in the county (an average of approximately 798 acres per operation) or 23.6 per cent of the total improved acreage. In other words, about 8 per cent of the county farmers utilize one-quarter of the total cultivated acreage available. It is more difficult to determine what fraction of the total of 309,261

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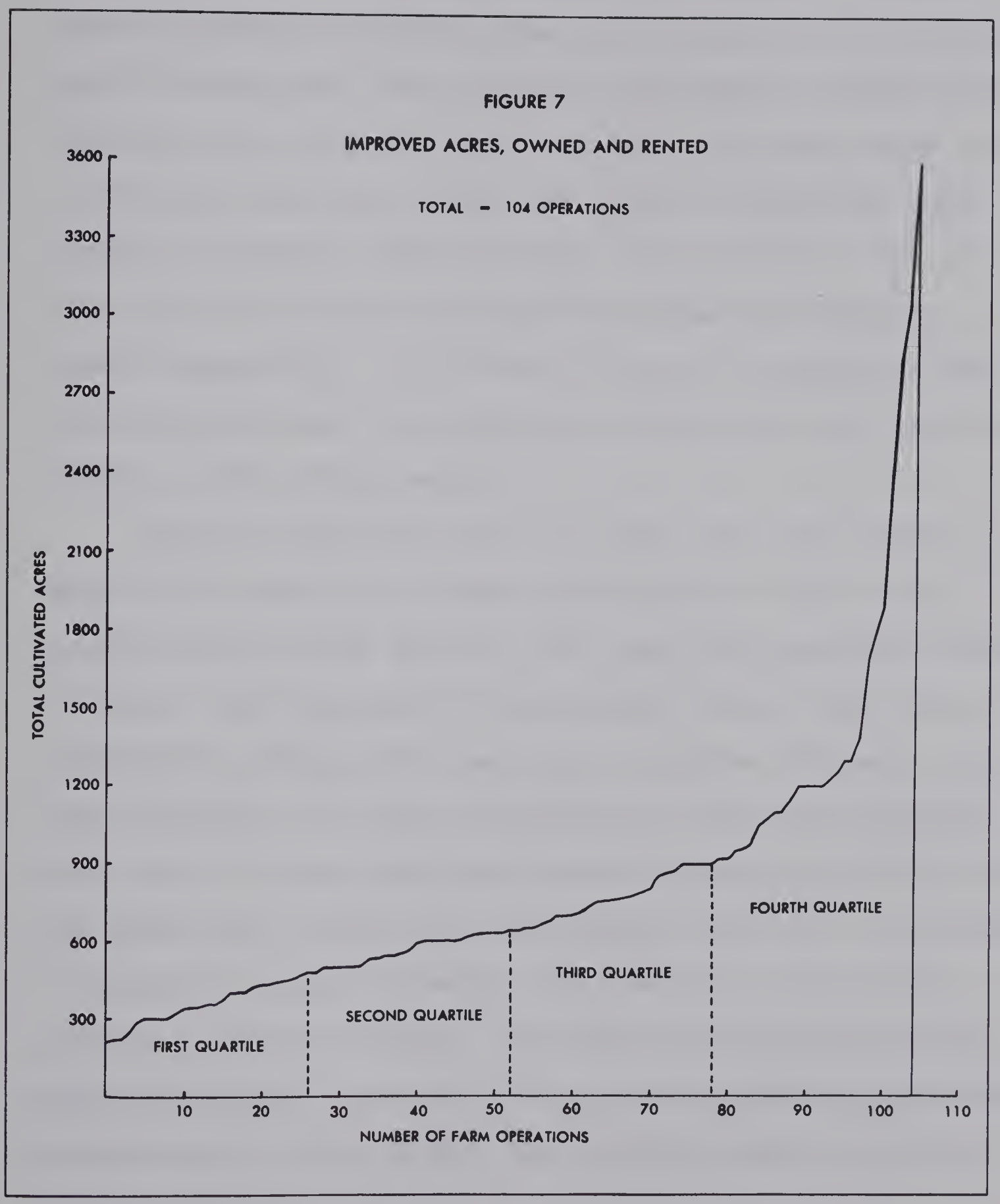
[15] Dominion Bureau of Statistics, Census of Canada, Agriculture (Alberta), 1966, Table 27-4.

FIGURE 7

IMPROVED ACRES, OWNED AND RENTED

TOTAL - 104 OPERATIONS



acres of unimproved land[16] in the county this group of farmers utilizes since some available grazing leases are utilized by farmers bordering the county as well. Many private grazing leases on unimproved private land are not legally contracted, but are verbal agreements between farmers; therefore, no reliable records of the total unimproved acres utilized by the study sample are readily available. The problem is further complicated by the fact that a few farmers with herds of various sizes utilize unimproved grazing leases communally. It is thus difficult to determine the size of unimproved leases that are effectively utilized by farmers in the study sample.

Figure 7 indicates that, in this area, the lowest quartile of operators in the sample farm on the average a cultivated acreage that is less than three-quarter sections of land. About one-half of the sample (53 of 104) farm a cultivated acreage that comprises a section of land or less. Taken together, the farm operations in the first two quartiles are 96.1 per cent mixed-farming operations (50 of 52). Two operations in the first and second quartiles are devoted exclusively to grain growing. By contrast, six of the operations that are larger than 640 acres are exclusively grain operations. The four largest grain-growing operations, consisting of 3,600, 2,850, 975 and 920 acres, are found in the top quartile.

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[16] Ibid., Table 27-4.

Figure 7 also shows that sixteen of the farm operations consist of from 1,200 to 3,600 acres of improved land. Nine of these sixteen operations raise as their only livestock beef cattle which consume farm-grown grain and fodder. On these operations, beef-cattle herds varying between 55 and 500 animals (an average of 273 per operation) are finished for market in feedlots. Four other large operations raise beef cattle and hogs, an average of 190 and 118 animals, respectively, per operation. One operation receives some income from 12 dairy cows in addition to its major income derived from 100 beef cattle and 250 hogs. Two operators farming over 1,200 acres grew grain only.

This pattern of the sixteen operations with the largest cultivated acres may foretell the future of large-scale farming in the area. Raising beef cattle, to consume grain and fodder, is the popular choice among these farmers, while the addition of hogs is a secondary venture. The two grain growers also expressed an interest in feedlot finishing of beef cattle; one of these previously marketed feeder cattle while the other planned to do so soon.

Probably one of the most important attitudes toward land in the county is that found among even some of the more innovative farmers who have never really felt compelled to maximize output from their improved, cultivated acres as additional unimproved land can still be rather easily obtained for cultivation. The pattern of extensive farming has generally persisted because of the availability of un-

improved land for grazing or for new breaking. The pattern of extensive cultivation, primarily geared to extensive grazing will probably persist if the farm-labour force declines steadily. This pattern is less demanding in terms of labour and capital inputs than an intensive system which cannot rely on "unlimited", unimproved acreages.

Table 3 shows the expectations farmers in the sample hold regarding the anticipated future needs for improved land in the area during the next ten to twenty years. Twenty-five of the 104 landholders feel that their existing improved acreage will be sufficient for the foreseeable future while five anticipate a reduction. Two of the latter group indicated that they have already reduced their acreage in cereals and are interested in buying grain instead of growing it. Sixty-four operators feel that expansion in cultivated acreage is necessary in order to maintain viable farm units. Whether this last group simply reflects an attitude that favours the continuation of an extensive pattern of land utilization is open to speculation. Suffice it to say now that size of improved acreage, taken alone, is no true indication of innovativeness or farm-business success, especially in a predominantly mixed farming area. McBain and Petersen, in a study of mixed farming in Alberta, contend that "size by cultivated acres is the best measure of size of business in an area devoted mainly to straight grain production, but in a diversified farming area where livestock production is being conducted also, it

TABLE 3 - ANTICIPATED NEEDS IN IMPROVED ACREAGE IN THE AREA DURING THE NEXT 10-20 YEARS

		Number of Farmers Indicating:		
		No Change	Increase	Decrease
1.	Acreage same as now	25		
2.	Acreage change by 0-20%		7	
3.	Acreage change by 20-40%		16	3
4.	Acreage change by 40-60%		8	1
5.	Acreage change by 60-80%		3	
6.	Acreage change by 80-100%		4	
7.	Acreage change by 150%		2	
8.	Acreage change by 200%		15	
9.	Acreage change by 250%		4	
10.	Acreage change by 300%		5	
11.	Acreage change by 500%			1
12.	No prediction, uncertain	10*		
	Sub Totals	35	64	5
			TOTAL	104

* The ten responses in this category were left in the "No Change" column as no increases or decreases were specified.

is not so suitable".[17] Nevertheless, diffusionists like Lionberger stress that "size of a farm is nearly always positively related to the adoption of new farm practices. Many new technological advances require large-scale operations and substantial economic resources for their use".[18] At any rate, the size of cultivated acreage may give "a visible impression of achievement" hence it cannot be discarded as a factor in a consideration of farm innovativeness (above, Chapter I, Part VIII, B).

Farmers in the sample suggested a variety of reasons for retaining or changing their present improved acreage. Four farmers specifically mentioned impending retirement or the prospect of selling the farm as a reason for either reducing the acreage under cultivation or for making no attempt to expand. Twenty-seven farmers who were intending to retain their present acreage or to expand somewhat indicated by their comments about farm size that they believed that it would be possible to intensify or maximize productivity on their present holdings if means for increasing productivity or profits per acre or per animal were practised. Fifty-four farm operators were of the opinion that increased farm size alone would be the best way to ensure increased

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[17] B.J. McBain and T.A. Peterson, Alberta Mixed Farm Production Cost Studies, 1951-1955. Alberta Department of Agriculture, Edmonton, 1955, p. 26.

[18] Lionberger, op. cit., p. 101.

volume of farm production. That volume would be increased with an increase in cultivated acreage is unquestionable. But there is no assurance that farmers who are as yet inefficient in the present use of their land and in maximizing output from existing acreages would necessarily become more efficient and realize higher profits by simply expanding. In fact, the converse may be true: questionable efficiency on a relatively small parcel of land may lead to greater inefficiency in operating larger parcels of cultivated land. Other reasons for not expanding included the lack of desire to expand, the availability of other sources of income, and the lack of hired help.

V. TYPE OF FARM ECONOMY

Specific innovations and improvements adopted or proposed by the sample of early adopters in the county will be examined later in Chapters IV and V. Here it will suffice to indicate that mixed farming is the predominant type of farm economy in the area with ninety-six of the 105 operations being preoccupied primarily with the production of cereals and fodder for the raising of beef cattle, hogs, and dairy cattle. Honey, poultry and sheep are minor contributors to the local farm economy. Nine operations can be considered specializations in that eight farmers produce grain almost exclusively while one apiarist produces honey only. While a farmer's primary source of income may be

derived from the sale of feeder cattle or hogs, for example, he is considered a mixed farmer in that he also produces almost all the feed necessary to raise marketable livestock.

One hundred farmers produced feed grains such as oats and barley, while forty-two raised wheat which varied from a few acres (and constituted a very minor part of farm income) to a high of ninety-five per cent of the total cultivated acreage for one operation. Eight farmers indicated that they grew some rapeseed, and one grew flax. Three of the eight grain farmers specialized almost exclusively in the production of commercial seed grain. Ninety-one farmers raised their own hay and legumes as fodder for their own cattle or for sale. The production of legume seed was mainly for local use, and only minor production was reported.

Thirty-one farmers earned income from their milk-cow herds ranging between five and forty milk cows. The total of 520 milk cows, kept by those who sold dairy products, was 8.7 per cent of all dairy cows in the county even though the dairy operators interviewed comprised 2.4 per cent of the county farm operators.[19]

Beef cattle constituted a more significant contribution to farm income as seventy-six operations, at the time of the survey, had beef herds ranging from 15 to 600 cattle.

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[19] D.B.S., op. cit., Table 29-3. The number of county farm operators relying on milk cows for farm income is not shown in D.B.S. figures.

A total of 9,550 beef cattle of all ages were reported. This total is 23.6 per cent of the 40,403 beef cattle in the county, raised by six per cent of the farmers.[20] The total number of beef cattle owned by the study sample may have been somewhat higher a few months prior to the interviews conducted in June and July, 1969. At least three farmers in the sample reported that they sold their entire beef herds consisting of "a few dozen", 250 and 700 cattle, respectively, when beef prices rose appreciably during the spring of 1969. Many producers of beef cattle normally sell finished cattle toward spring, thus further reducing the number of cattle reported at the time of the interviews, although calves born in spring and retained through the summer may have cancelled out the reduction incurred by sudden sales of entire herds.

Sixty-two hog producers reported the ownership of a total of 7,728 pigs of all ages. This total accounted for 24.7 per cent of the total of 31,310 hogs[21] reported for the county, even though these hog producers were only 4.9 per cent of all operations in the county.

Other farm enterprises contributed in a minor way to gross income. Forty-five operators reported raising poultry and eggs primarily for home consumption. Eight operators

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[20] Ibid., Table 29-3, D.B.S.

[21] Ibid.

sold eggs, mostly in the local area. One operator was raising 1000 broilers while another specialized in the production of hatching eggs from 900 hens. Two operators kept 242 sheep, primarily for their wool. One operator regularly maintained a herd of about twenty saddle horses which were usually sold locally.

The foregoing breakdown of livestock production reveals that the adoption leaders in all cases produce a considerable fraction of all livestock, proportionate to the number of farm operations in the county. In addition to the present number of livestock owned, the adoption leaders also anticipated substantial increases in the livestock population in the area. Fourteen dairy operators planned to increase their dairy herds, while only two were content to retain the same herdsize. Seventy-four operators were considering expanding their beef herds, or converting from other livestock to beef cattle, due, in large measure, to rising beef prices during the spring and early summer of 1969. Three operators were content with their present beef-herd size while two desired a reduction. Thirty-one farmers were considering increased specialization in hogs while five had no desire to expand. Proposed increases in beef cattle and hog populations reflected an interest in converting unsalable surpluses of grain into beef and pork which were more readily marketable.

This cursory examination of the type of farm economy that the county farm sample has adopted may be an indication

that this group of farmers, taken as a whole, may indeed strive to achieve the objectives of The B-12 Plan by doubling agricultural production in the area. Undeniably, a greater emphasis on livestock production will result as stores of cereal grains continue to mount. Some farmers indicated that their livestock inventory could easily double or triple in a few years but feared that overproduction of livestock would soon result in an unfavourable marketing situation. Twenty-four of the farm operators revealed that, with accumulating grain surpluses, they would not contemplate specialization in just one line of livestock production but would continue to produce both beef cattle and hogs as the most effective way of reducing grain stockpiles.

Rogers has unequivocally stated that "early adopters have more specialized operations than later adopters [and that] innovators, especially, tend to be specialized, and place 'all their eggs in one basket'".[22] This generalization may not at the present time apply to the study area even though many farmers realize that specialization allows them to keep effectively abreast of developments in their specialty. The present grain-marketing crisis and a series of unfavourable harvests which have resulted in the accumulation of tough and damp grain have caused farmers to turn to short-term measures for disposing of feed-grain surpluses.

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[22] Rogers, op. cit., p. 177.

CHAPTER III

COMMUNICATION AND SOCIAL PARTICIPATION

The patterns of communication and social participation that farmers in an area establish over time are basic variables in explaining how agricultural innovations are diffused. The interaction of farmers with other farmers or with non farmers may involve either personal, direct contact or it may be an impersonal process of indirect contact through the mass media or other communications channels. Here, both of these means of persuading or educating farmers to learn about innovations will be examined.

Interaction within a social system, whether in a spatially restricted area such as the County of St. Paul, or in a broader social system or "community" which has no precise boundaries, has often been examined by social scientists for its importance in diffusing new ideas. Channels of communication and social participation, developed over time, moreover, have an important spatial aspect. Hagerstrand has the impression that

> information and influence travel in a system of communication with a rather stable spatial configuration. The number of links between areas and places seem to remain very much the same over time even when the acting individuals change.[1]

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[1] T. Hagerstrand, "Aspects of the Spatial Structure of Social Communication and the Diffusion of Information". Regional Science Assoc., Papers, Vol. XVI, Cracow Congress, 1965, p. 29.

This chapter will focus primarily on the spatial pattern of information-seeking relationships of the sample farmers within their own area and the pattern of similar relationships or contacts with areas, farmers and non-farmers beyond the study area. With this emphasis, a picture of the network of social communications of the early adopters within and outside the county will be depicted. Whether there is a marked stability in the spatial configuration of linkages between the study area and other areas, as Hagerstrand suggests, must await the findings of future studies, conducted at intervals.

I. COMMUNICATION CHANNELS FOR DIFFUSING INFORMATION ABOUT AGRICULTURAL INNOVATIONS

Considerable research during recent decades has revealed that the most effective communication of a new idea occurs "through face-to-face contacts which depend upon propinquity, along with other positive motivating factors".[2] There is sufficient evidence to indicate that personal sources of information may leave a deeper impression on the receiver of information than do impersonal sources. The emphasis, in varying degrees, on the use of formal, impersonal sources by

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[2] L.W. Bowden, Diffusion of the Decision to Irrigate, Simulation of the Spread of a New Resource Management Practice in the Colorado Northern High Plains. University of Chicago Press, Chicago, 1965. Preface, xviii.

agricultural advisory personnel and agencies persists, however. Often this is because there are insufficient professional advisers to establish informal, personal contacts with farmers. As well, the motivation and goals of the adviser or advisory agencies vary, and often insufficient financial or institutional facilities are made available for promoting agricultural adjustment through the adoption of innovations.

Admittedly, the ideal of personal contact of farmers with the best available sources of information cannot be realized in practice for numerous personal and logistic reasons. Further, merely increasing the intensity of communication through more frequent personal or impersonal contacts with farmers provides no assurance that the level of knowledge of farmers or their rate of adoption of innovations or agricultural adjustments will increase. Only on-going research and experience can isolate the variables that are pertinent to the process of communication within any farm community.

A. Basic Sources of Farm Ideas

Thirty-five of the farmers in the sample preferred local (within the County of St. Paul) sources of farm information to any other sources. Thirty-seven indicated that they preferred outside or external (beyond the county) sources while thirty-three felt a combination of both local and outside sources was desirable. The reasons used in explaining the preference for these sources revealed that, generally:

(1) Thirty-seven of the farmers were of the opinion that the local farming experiences of other farmers combined with their own experienceswere best able to meet local needs and to bring about the desired changes in agriculture, (2) Forty farmers reasoned that outside and official sources of information, whether derived from the mass media or official governmental or other publications, were the best and most accurate sources of information about innovations, and (3) twenty-six operators felt that some combination of the previous reasons was the most realistic approach to adopt in assessing the value of agricultural innovations.

In summary, approximately one-third of the sample preferred to rely on local experience while another one-third contended that external information sources were most accurate. Yet, it is commonly recognized by researchers of the diffusion of innovations that "the greatest number of improved farm ideas and practices originates externally to a particular farm community".[3] Further, Marsh and Coleman have found that local sources of farm information tend to influence the adoption of agricultural innovations negatively in that, usually, "group norms and expectations retard change.... The greater the extent to which farm matters are group-sanctioned (by kin or locality), the slower the acceptance of farm prac-

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[3] F.D. Leuthold, Communication and Diffusion of Improved Farm Practices in Two Northern Saskatchewan Farm Communities. Canadian Centre for Community Studies, Saskatoon, 1966, p. 59.

tices".[4] The reliance in the study area on local experiences, even among a large group of those considered early adopters, may indicate that communications with more progressive farming communities are only weakly developed.

B. Influence of Mass Media

The sample indicated that the average adoption leader subscribed to, and utilized in varying degrees, 5.2 magazines, pamphlets and publications that reflected largely external or official views and information about new farm ideas. As well, an average of 1.8 commercial publications regularly entered the farm household. However, the farmers could only vaguely relate what impact the mass media had on them, using printed materials as one indicator of external, impersonal contact with farm innovations or innovators. Mass media sources of information (including radio and television) appeared too impersonal to the majority of farmers to have much relevance to the farmers' immediate problems. Nevertheless, the Country Guide was cited as the magazine providing the most practical hints about a variety of farm practices or improvisations.

"Impersonal communications", Rogers asserts, "function mainly as rapid, one-way, efficient dispensers of information

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[4] P.C. Marsh and A.L. Coleman, "The Relation of Neighborhood of Residence to Adoption of Recommended Farm Practices". Rural Sociology, Vol. 19, 1954, p. 389.

....Because of their 'mass' nature they cannot be beamed at a specialized or local audience".[5] Mass media sources certainly did create a broader awareness of farming innovations but they did not act as the chief vehicle for promoting agricultural change in the study area. However, subscription to newspapers and magazines, as a measure of contact with mass media, "is sometimes considered a symbol of mass society status",[6] the degree to which a community has adopted an outward orientation or become cosmopolitan in outlook. In the absence of comparative data on the number of subscriptions early adopters of farm innovations in other areas of Alberta have, it is difficult to assess the relative mass society status of farmers in the study area. However, Buckmire found that in the Bonnyville area, immediately north of the study area, only 29.9 per cent of his sample of farm operators subscribed to three or more magazines.[7] This compares with 94.3 per cent of farmers in the St. Paul sample who subscribed to three or more. Since the Bonnyville sample was primarily composed of low status farmers and the St. Paul sample comprised mainly high status farmers, the

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[5] E.M. Rogers, Diffusion of Innovations. The Free Press, New York, 1968, p. 99.

[6] H.F. Lionberger, "Some Characteristics of Farm Operators Sought as Sources of Farm Information in a Missouri Community". Rural Sociology, Vol. 18, 1953, p. 333.

[7] G.E. Buckmire, Occupational Mobility of Farm People in the Bonnyville District. Agricultural Economics Special Report No. 1, University of Alberta, 1966, p. 151.

difference may indicate a higher mass society status for the adoption leaders in the County of St. Paul.

C. Use of Agricultural Service Personnel

Forty-one farm operators, or 39 per cent of the study sample, said they had consulted periodically with district agriculturalists within the County of St. Paul or in other areas. To this group the district agriculturalists functioned as the most accessible or accurate personal sources of information in the local area. Fifteen operators, or 14.3 per cent of the sample, utilized the County of St. Paul agricultural fieldman as their primary personal source of farm information. Thirty operators, 28.6 per cent of the sample, utilized both of the above personal sources equally; nineteen operators, 18.1 per cent of the sample, utilized neither of the above. Additionally, four farmers mentioned a local veterinarian, three a fertilizer dealer, two a farm economist, and another a grain elevator agent as their most useful personal sources of agricultural information.

Doscher, in her Survey on Farmers' Attitudes,[8] found that 32 per cent of a cross-section of Alberta farmers named professional people as their best sources of ideas. In the County of St. Paul, 45 per cent of the sample farmers design-

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[8] L.B. Doscher (research consultant), Survey on Farmers' Attitudes. Farmers' Union and Cooperative Development Association, Edmonton, 1964, p. 41.

ated professional people (district agriculturalists, veterinarians, economists) as valuable sources of information.

Officially, the services of district agriculturalists (and other professional advisory sources) are available to all farmers equally. In practice, however, other farmers whose expertise varies may constitute a more significant source of information to the adoption leaders than professional advisers. Occasional contacts with a professional adviser may have less impact on the adoption leaders than frequent farmer-to-farmer contacts.

Only one salesman within the county was mentioned, by three farmers, as the best commercial agricultural adviser. This may indicate that despite the accessibility of salesmen or farm-supply dealers, they communicate few new ideas to farmers in the study sample, or they may be held in low esteem by the early adopters. There may be little confidence accorded salesmen as they generally appear to farmers to have a vested interest only in selling and may exhibit little concern for providing reliable information or knowledge about alternative ways of solving particular farm problems.

D. Adoption Leaders Who Provide Most Useful Farm Information

The adoption leaders were asked to name those farmers within the study area whom they considered the most useful sources of information about new farm ideas. In addition, they were asked the location of farmers, advisory agencies or information sources that they utilized outside the County

of St. Paul.

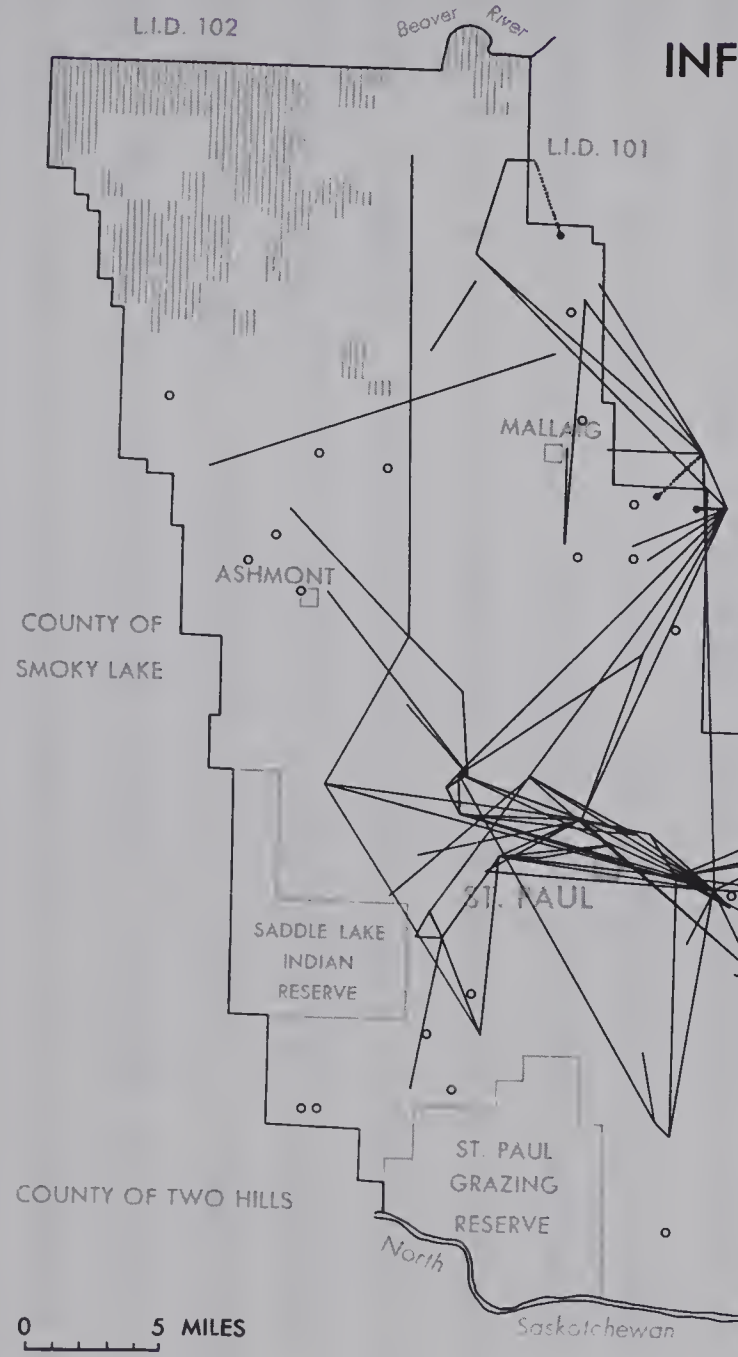
Figure 8 shows the information-seeking relationships farmers in the study sample have established among themselves. In the sample of 105 farmers, fifty-seven farmers were mentioned only once as good sources of information, while twenty one were mentioned two or more times. Twenty-seven farmers were isolates in that they neither mentioned other farmers nor were they mentioned by others (Figure 8).

In Figure 8, straight lines extending from the seekers of information to the farmers being sought as information sources are shown without directional arrows. It was assumed that one-way communication does not, in effect, occur. Those farmers who designate other farmers as good sources of information but are not designated as good information sources themselves should not be considered isolates, communication-wise. Information that is sought from a farmer is not one-way communication; the interpersonal exchange of information presents an opportunity for feedback to the giver of information as well. Feedback on the value of information transmitted is useful to both the seeker and the source of information.

The density of the network of interpersonal communication shown in Figure 8 is most pronounced around the town of St. Paul and in the area north of St. Paul, extending slightly into the Municipal District of Bonnyville. One independent communications network is found near Heinsburg, and a semi-independent network centers on Elk Point. The dominance of

FIGURE 8

INFORMATION-SEEKING RELATIONSHIPS, COUNTY OF ST. PAUL



LEGEND

UNIMPROVED, UNOCCUPIED LANDS

FARMERS NOT INCLUDED IN INFORMATION - SEEKING NETWORK

QUARTER SECTION OWNED BY FARMER RESIDING OUTSIDE COUNTY

the farming community centering on St. Paul in the communications pattern is striking. Of the nine farmers that were designated as good information sources by five or more farmers, seven are within the St. Paul farmer-to-farmer communications network and two within the Elk Point network.

Figure 8 also illustrates important spatial patterns. Generally, the intensiveness of contacts drops off markedly as distance from the dominant center, St. Paul, increases. This is apparent, for example, in the Ashmont area and the area southwest of St. Paul where a group of farmers are unaffected by the information-seeking network centered on St. Paul. Some of these farmers may not only be peripheral to the St. Paul network but to the networks of other dominant centers in adjoining counties. Only one farmer in these areas indicated that he sought farm information from another farmer in an adjacent county. The communication process originating in the St. Paul community obviously affects farmers in the county unequally. The Heinsburg farming community, roughly equidistant from the towns of St. Paul and Vermilion (Figure 11), exhibits a pattern that contrasts sharply with that of the southwestern sector or the Ashmont area. Instead of remaining peripheral to both of these towns and their respective farming communities, the Heinsburg farming community has established closer links with Vermilion. Four adoption leaders in the Heinsburg area mentioned Vermilion as a center of good ideas about innovations. In addition, Figure 8 shows that the Heinsburg farm sample interacts

locally, as shown by the information-seeking network in the area, whereas the sample of six farmers near Ashmont shows no interaction. The explanation for the differences between the Ashmont farming area, the southwest sector, and the Heinsburg community is beyond the scope of this study.

1. Prime Information Givers

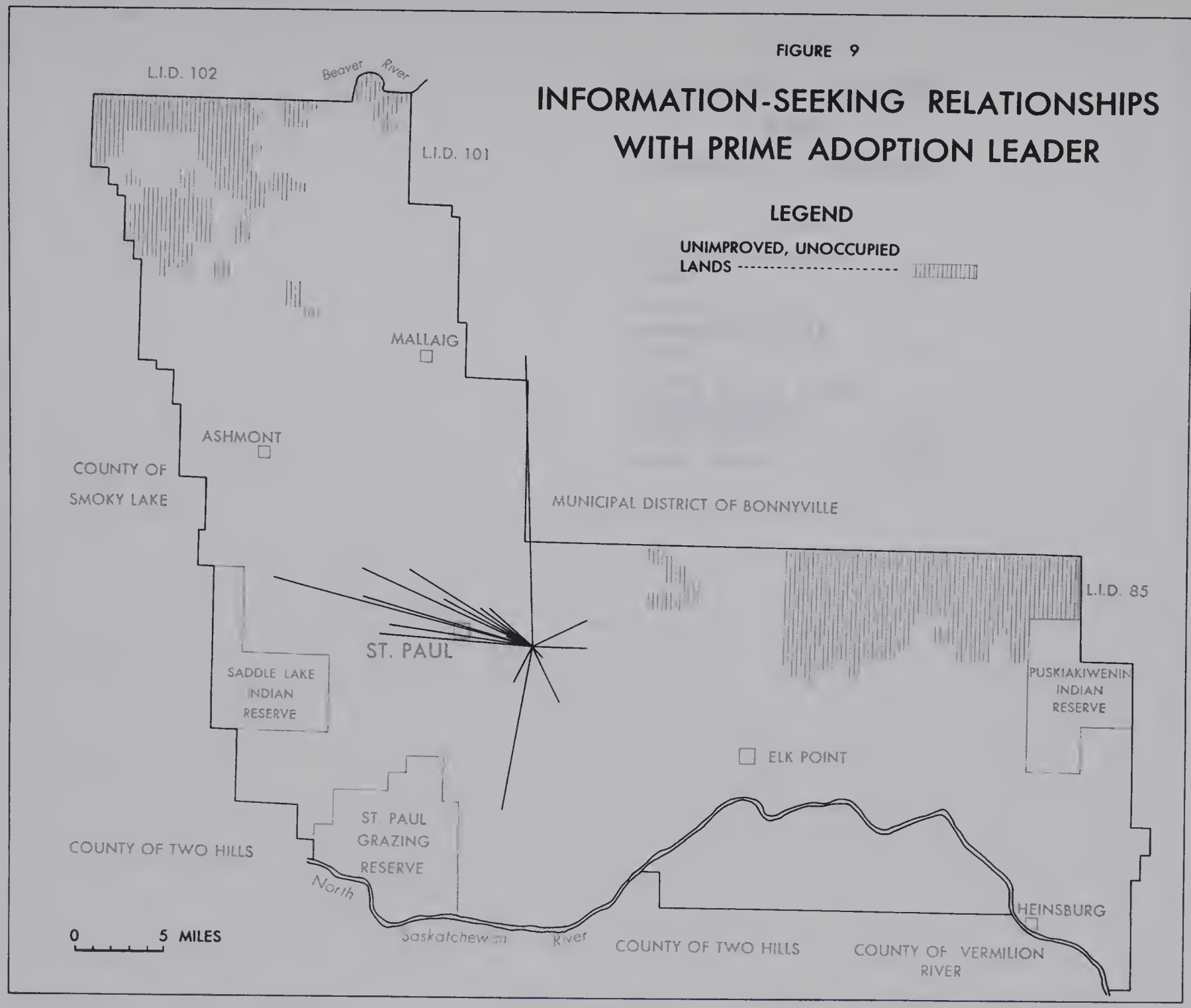
A closer examination of the pattern of interpersonal contacts reveals that one farmer was designated by seventeen others as the prime information giver or adoption leader (Figure 9). Eight other farmers, represented by proportional circles in Figure 10, received from nine to five designations as good information givers in the county. Of the total of 125 designations (some farmers had selected more than one farmer, as previously indicated) by the entire sample, these nine farmers received a total of 70 designations. This is 56 per cent of the total number of designations for the entire sample of 105 even though it constitutes only 8.6 per cent of the total study sample. Each of the nine farmers receiving the most designations was mentioned, on the average, by approximately eight other farmers as a prime information giver.

2. Sanction Leaders

It is clear from the above that a small number of farmers in the county serves as the primary sources of opinion leadership. Whether this group of nine also doubles as

FIGURE 9

INFORMATION-SEEKING RELATIONSHIPS WITH PRIME ADOPTION LEADER

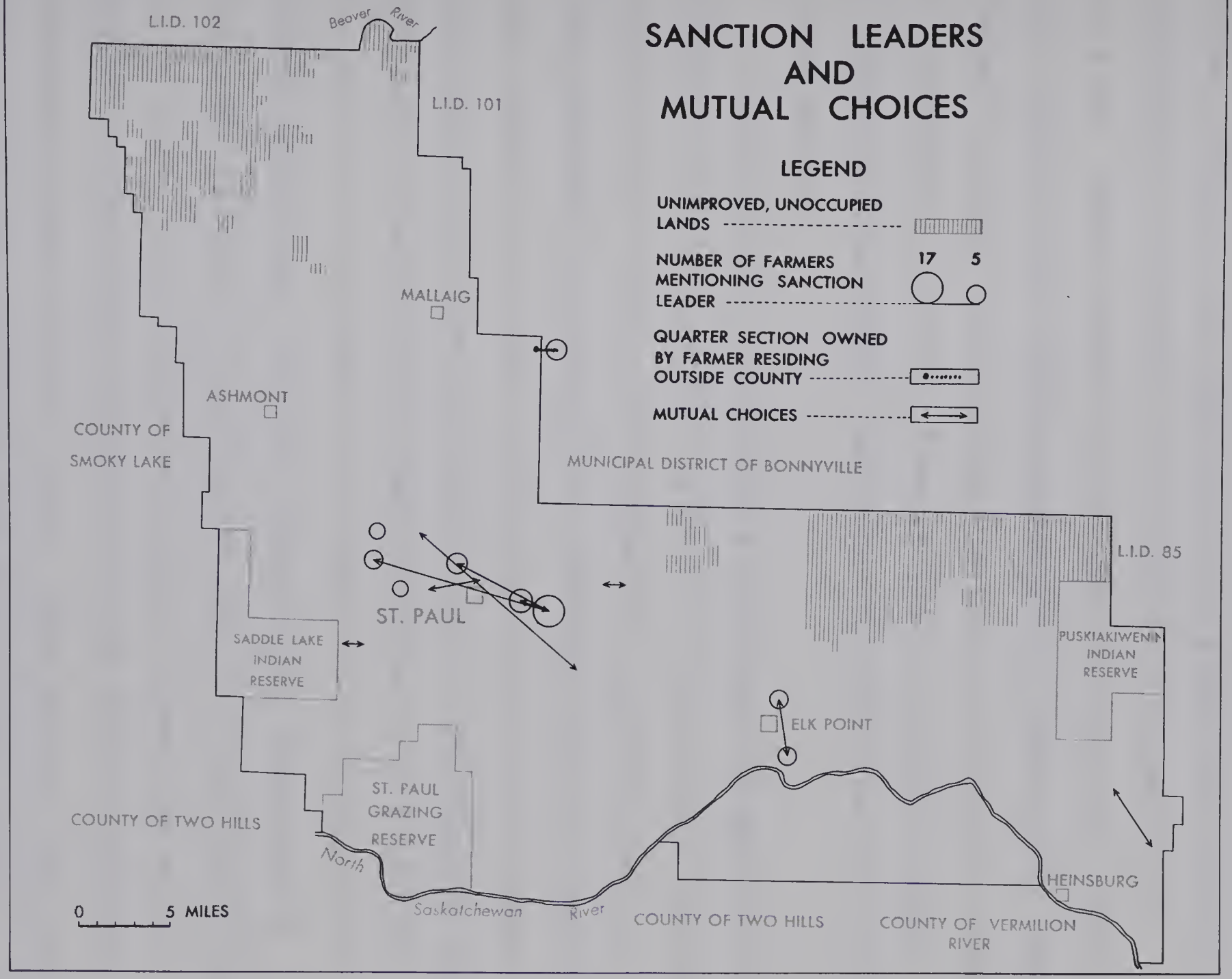


LEGEND

UNIMPROVED, UNOCCUPIED LANDS ----------

FIGURE 10

SANCTION LEADERS AND MUTUAL CHOICES



LEGEND

UNIMPROVED, UNOCCUPIED LANDS

NUMBER OF FARMERS MENTIONING SANCTION LEADER — 17 5

QUARTER SECTION OWNED BY FARMER RESIDING OUTSIDE COUNTY

MUTUAL CHOICES

the group of farmers who serve as the prime sanction leaders in sanctioning agricultural practices in the county is debatable. There are, nevertheless, a few indicators from further evidence that they may play a significant part in sanctioning the adoption of agricultural innovations in the area. Three farmers in this group of nine were officially invited by the Alberta Department of Agriculture, during the year previous to the study, to speak to the native people on the Saddle Lake Indian Reserve (part of which is shown in Figure 8) about grain, beef and hog production practices in the county.

If officials in the Alberta Department of Agriculture recognized that these three farmers were the most frequently sought personal sources of information regarding the practices mentioned, this may be an indication that, in reality, these farmers sanctioned farming practices in their community, centering on the town of St. Paul. They may have been officially consulted to add their approval or sanction to the efforts of the Saddle Lake farmers in launching their farming enterprises. Further, there is an indication in Figure 10 that these three farmers and one of the remaining six in the "sanction leadership group" interact as mutual choices in exchanging information in the farming community centering on the town of St. Paul. This group of four, and other farmers who designated them as the prime opinion leaders, seem to form a fraternity of leading farmers who sanction local practices. The closed networks of information

transmission centered near Heinsburg and Elk Point (Figure 8) may indicate that the phenomenon of sanction leadership operates within these farming communities as well, and is distinct from the sanction system centered on St. Paul.

E. Previous Research on Information Transmission

Hagerstrand found that "the density of contacts included in a single person's private-information field must decrease very rapidly with increasing distance".[9] Thus, farmers in the Heinsburg community, because of their distance and relative isolation from major farm communities in the county, established no contacts with either of the major farming communities of St. Paul and Elk Point. The dominant community, St. Paul, exhibits a more clustered spatial pattern of communications links than do the communities which are further removed from it. Distance from dominant centers of innovation or opinion leadership affects the contact possibilities of farmers in the study area. Hagerstrand states:

> Since telling over shorter distances is much more common than over longer ones the neighborhood effect comes out very strongly.... Occasional jumps of innovation over longer distances at the beginning of the process tend to create secondary centers later on.[10]

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[9] Cited in A. Pred, Behavior and Location-Foundations for a Geographic and Dynamic Location Theory. Department of Geography, The Royal University of Lund, Sweden, 1967, p. 32.

[10] Hagerstrand, op. cit., p. 31.

Considering the largely closed nature of the communications networks centered near Elk Point and Heinsburg, it appears that these centers do serve as secondary centers of innovation, at least in the sense of the minor impact they appear to have on the remainder of the county.

Socioeconomic research abounds with generalizations which indicate that "information tends to diffuse through groups of people with similar status".[11] The study sample, composed of many farmers with similar status confirms this statement. A study of the total network of communications in the county might reveal how status similarities and differences function to promote or thwart the adoption of innovations. However, it appears "obviously impossible to create a full picture of the network of social communication for a population of even a moderate size."[12] The present study recognizes this limitation; the above generalization on status and diffusion of information appears relevant in the study area. The intimacy of friendships, especially among the sanction leaders in the county, probably explains much of the ease of communication among farmers in this group. In Figure 8 the lines of opinion leadership (or status) form a sociogram which, however, portrays only a small fraction of the spatial interaction and processes that foster the

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[11] Pred, op. cit., p. 34.

[12] Hagerstrand, op. cit., p. 29.

adoption of new ideas.

Whether the group of presumed sanction leaders, characterized previously, is synonymous with those farm operators who excel in information transmission or opinion leadership, is a conjecture requiring further study. Suffice it to say that in a sample of farm operators in a Saskatchewan study, Leuthold designated farmers as opinion leaders if they were named five or more times by other farmers. The group arbitrarily designated as "sanction leaders" in the present study (8.6 per cent of the sample) approximates the ten-per-cent group of opinion leaders in Leuthold's study.[13] Functionally, a "friendship network" and a network of opinion or sanction leadership in a farming area may be highly identical.

In early studies of primarily "ethnic" farming communities, the broad similarities in farming practices were attributed to the facility of information-seeking relationships due to similarities in language or culture.[14] As impersonal market and technological pressures increased the drive to rationalization and efficiency in agriculture, primarily after World War II, ethnic differences in moderni-

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[13] Leuthold, op. cit., pp. 89-91.

[14] See, for example, H.A. Pederson, "Cultural Differences in the Acceptance of Recommended Practices". Rural Sociology, Vol. 16, 1951, pp. 37-49, and A.W. Van Den Ban, "Locality Group Differences in the Adoption of New Farm Practices". Rural Sociology, Vol. 25, 1960, pp. 308-320.

zing agricultural production became increasingly de-emphasized in farm-innovation studies. Within the study sample ethnic cohesiveness regarding farm practices was difficult to discern. No farmers in the sample spoke of ethnic differences in communications patterns and innovativeness. There appeared to be a desire in the study sample to locate, observe, and then adopt, whenever possible, new ideas emanating from those farmers who were most readily accessible and knowledgeable, irrespective of nationality, language or religious differences.

F. Information-Seeking Relationships with Outside Areas

Figure 11 and Table 4 show those centers in Alberta which were mentioned as sources of farm ideas for farm operators in the study area. Edmonton and Vermilion are the primary centers contacted by the study sample. Both centers were able to provide information from both farming and non-farming sources. The area encompassing Edmonton and its outskirts provided information through the University of Alberta and the University of Alberta Farm, the Alberta Department of Agriculture, machinery dealers, livestock commission firms, a seed company, an artificial insemination association and a feeders' day exhibit. A few farmers on the outskirts of Edmonton, primarily dairymen, were contacted. Vermilion, with its long established school of agriculture was accessible by telephone or through direct visits. Additional practical information was obtained by

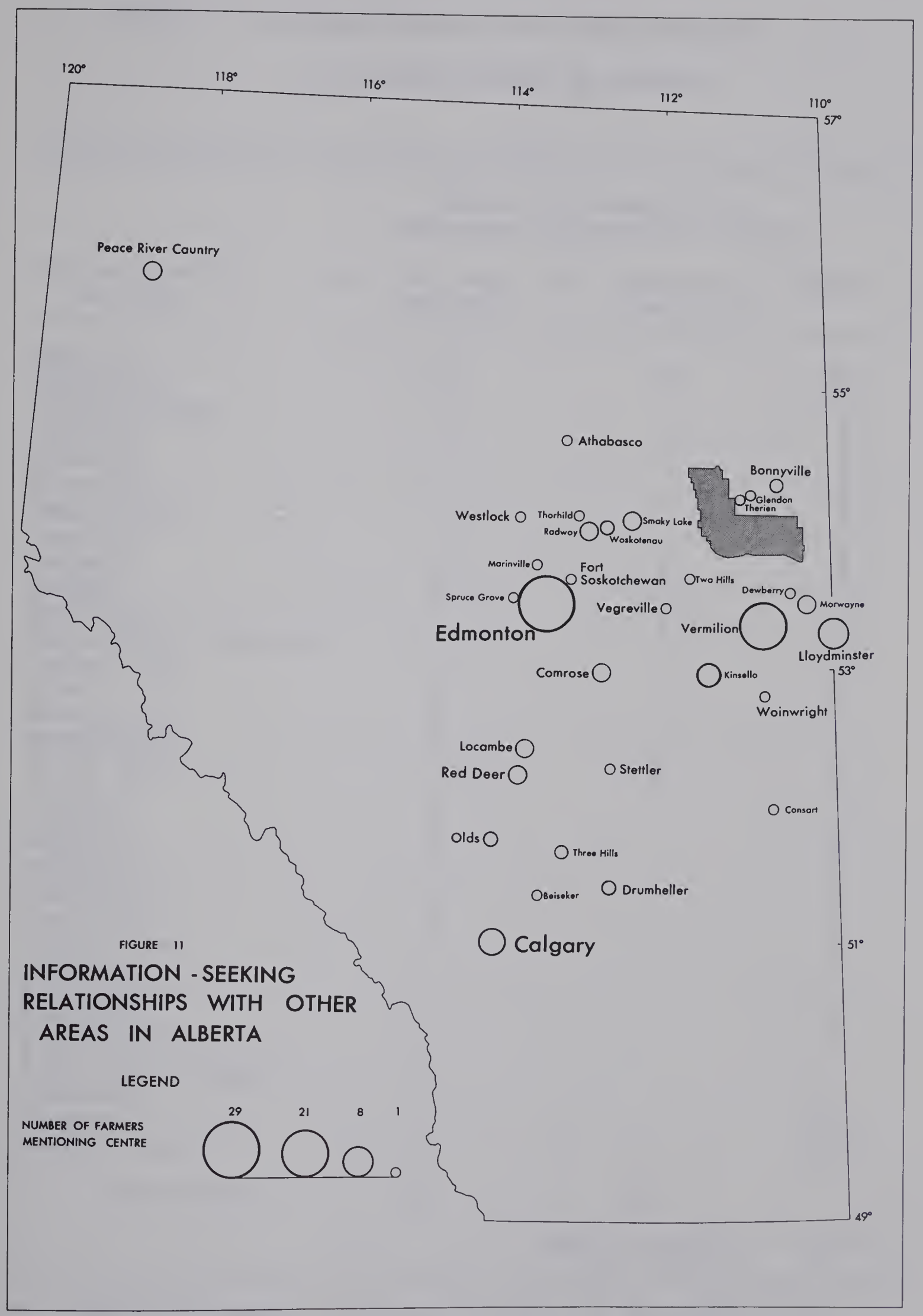
120°
118°
116°
114°
112°
110°
57°
55°
53°
51°
49°
Peace River Country
Athabasco
Bonnyville
Glendon
Therien
Westlock
Thorhild
Smoky Lake
Radwoy
Waskatenau
Marinville
Fort Saskatchewan
Two Hills
Spruce Grove
Vegreville
Dewberry
Morwayne
Edmonton
Vermilion
Lloydminster
Comrose
Kinsella
Wainwright
Locombe
Red Deer
Stettler
Consort
Olds
Three Hills
Beiseker
Drumheller
Calgary
FIGURE 11
INFORMATION - SEEKING RELATIONSHIPS WITH OTHER AREAS IN ALBERTA
LEGEND
NUMBER OF FARMERS MENTIONING CENTRE
29
21
8
1

TABLE 4 - INFORMATION-SEEKING RELATIONSHIPS WITH OTHER AREAS IN ALBERTA

Nearest Center or Area	Number of Farmers Who Obtained Information Through A. Personal Contact*	B. Indirect Contact**	Total
Edmonton	13	16	29
Vermilion	16	5	21
Lloydminster	8	-	8
Calgary	4	2	6
Kinsella	5	-	5
Marwayne	3	-	3
Smoky Lake	3	-	3
Camrose	3	-	3
Lacombe	2	1	3
Radway	2	1	3
Red Deer	2	1	3
Peace River Country	2	1	3
Bonnyville	2	-	2
Olds	2	-	2
Drumheller	2	-	2
Waskatenau	1	1	2
Three Hills	1	1	2
Therien	1	-	1
Glendon	1	-	1
Dewberry	1	-	1
Athabasca	1	-	1
Thorhild	1	-	1
Two Hills	1	-	1
Vegreville	1	-	1
Westlock	1	-	1
Wainwright	1	-	1
Morinville	1	-	1
Stettler	1	-	1
Fort Saskatchewan	1	-	1
Beiseker	1	-	1
Consort	1	-	1
Spruce Grove	1	-	1
Sub Totals	86	29	
		TOTAL CONTACTS	115***

* Usually through a personal visit, or as part of an organized tour.
** Information sought by letter or telephone.
*** Repeated contacts with the same center or area are not shown.

contacting farmers in the Vermilion area. Other centers provided information relating to the particular needs of farmers in the study area. Usually, other information sources in or near the centers listed in Table 4 were contacted personally. The University of Alberta farm at Kinsella and the Lacombe Experimental Farm provided a few farmers with the opportunity to obtain agricultural information directly from agricultural scientists, similar to the information obtained from the University of Alberta in Edmonton.

Table 5 indicates that other provinces within Canada, or states or regions in the United States were utilized less frequently as information sources. France was visited by two farmers who sought information about Charolais cattle.

G. Previous Literature on Farmers' External Contacts

Most studies in rural communication have found that farmers who establish contacts with farmers and information sources outside their immediate farming community or area have a greater propensity to accept, or be influenced by, new agricultural practices. Farmers who have had personal contact with research and advisory personnel from schools of agriculture, universities or experimental farms are more likely to be more innovative than those who rely on local information sources, often of unknown expertise. The commitment on the part of farmers to personally see practices outside their area and to seek out information directly from the best available sources is often used as one index of

TABLE 5 - INFORMATION-SEEKING RELATIONSHIPS WITH AREAS OUTSIDE ALBERTA

Location	Total Number of Personal Visits	Number of Farmers Involved
Canada:		
Saskatchewan	5	5
Ontario	2	2
British Columbia	1	1
United States:		
Montana	3	3
Colorado	2	2
Dakotas	1	1
Kansas	1	1
Texas	1	1
Michigan	1	1
Ohio	1	1
Great Plains States	1	1
West Coast States	1	1
"Corn Belt" States	1	1
Europe:		
France	3	2
TOTALS	24	23

innovative farming behavior. Whether the adoption leaders in the County of St. Paul are more or less innovative than other farmers deemed to be adoption leaders in other areas of the province must await the findings of comparative research. The index described might be utilized.

The network of communications that farmers in the study area have created in seeking information from other areas is spatially significant as indicated previously by Hagerstrand (above, page 58). If the system of communications that the farm operators in the study area have established with outside information sources has had the effect of assisting in the modernization of agriculture and the maximization of agricultural output, it can be considered to have served the early adopters and the study area in a positive way. This study cannot, however, assess the positive or the negative effects of the spatial contacts established with the centers shown in Figure 11 and Tables 4 and 5. It can be said, nevertheless, that the dominant Alberta centers, Edmonton and Vermilion, with which contact has been established over time are generally significant centers of innovation and accurate information dispensers in the estimation of most farmers in the study sample.

II. SOCIAL PARTICIPATION

Farmers obtain information about ideas applicable to their farming operations from the social contacts they esta-

blish with farmers and non-farmers. In this study the involvement of the adoption leaders in the formally-structured social, educational or other organizations and clubs within and outside the County of St. Paul was examined. The patterns of formal social participation in organizations, associations or clubs that might have assisted the adoption leaders directly or indirectly in their farming practices and farm management were examined because they were more apparent to the adoption leaders than the patterns of informal social participation. The adoption leaders were able to describe their roles in formal organizations with greater accuracy than their informal involvement in the social system within the county.

Even those farmers who do not very often interact formally with others in the study area "do not live apart from others and independent of their influence.... Few [farming] decisions can be made without regard for others who are involved directly or indirectly."[15] Lionberger elaborates on how participation in a social system is interwoven closely with the adoption of farm innovations, thus:

> Deference to neighbors and friends in at least some matters related to farming is more likely than not. Since neighborhoods differ in the importance attached by residents to the acceptance of change in farming and to the status accorded persons who are quick to

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[15] H.F. Lionberger, Adoption of New Ideas and Practices. Iowa State University Press, Ames, Iowa, 1960, p. 67.

> adopt new practices, their influence on change may be considerable.[16]

Whether a farmer identifies socially with farmers whom he considers the "top farmers" in his area, or with non farmers, affects his perception of agricultural change and may determine his reaction to it. An individual adoption leader may not reach the decision to adopt desired agricultural innovations on the basis of his formal social participation alone. As indicated previously in this chapter, "it is within the informal social structures that most of the interpersonal exchange of farm information takes place".[17] Most of the information-seeking links shown in Figures 8 and 11 were based on informal, interpersonal contacts. There appears, however, to be a correlation between formal social participation and adoption leadership: "While broad social orientation does not insure competence as a farmer, it does seem to make incompetence less likely".[18] Rust, in assessing the role of social participation in farm management concludes, succinctly, "...there must be time for the farmer to get away from his own problems long enough so that he can get a new perspective on their solutions [by interacting profession-

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[16] Ibid.

[17] H.F. Lionberger and C.M. Coughenour, Social Structure and Diffusion of Farm Information. University of Missouri, Research Bulletin 631, 1957, p. 4.

[18] Lionberger, op. cit., p. 16.

ally and socially with others]".[19]

A. Organizations Considered Most Helpful by the Adoption Leaders

The adoption leaders were asked two questions: (1) Which local organizations or clubs do you think are most helpful in providing local farmers with an opportunity to discuss and exchange new ideas, suggestions, or advice about farming? and (2) Which of these organizations or clubs is most helpful in providing you with new ideas for improving your own operation?

Thirty-eight adoption leaders considered the Farmers' Union of Alberta as the farm organization most useful to farmers in the local area. However, only twenty-five farmers considered the F.U.A. as the organization most helpful in improving their own operations. These figures may indicate that even though roughly one-third of the adoption leaders feel that the F.U.A. is a significant source of new ideas to local farmers generally, the adoption leaders feel that the organization is of less value to them in providing ideas for improving their own operations.

Table 6 shows which local organizations were considered most useful for the adoption leaders. Thirty-nine of the 105 operations considered local farm organizations of value to

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[19] R.S. Rust, "Farm Survey Data Relationships with Managerial Ability". Economic Annalist, Vol. 34, February, 1964, p. 14.

TABLE 6 - ORGANIZATIONS CONSIDERED MOST HELPFUL TO EARLY ADOPTERS

Reasons for Citing Organization	Name of Organization* - F.U.A. (25)	- 4-H Clubs (4)	- Agricultural Advisory Board (3)	- Cooperatives (2)	- Other (5)
1. Useful publications; keeps one abreast of innovations and other developments in agriculture.	1	3		1	1
2. Applicable ideas; helps farm operation directly or provides new insights into farming.	12	2	2	1	5
3. Desirable contacts with best farmers in local area or with knowledgeable speakers.	11		1		1
4. Useful pressure group.	8				
5. Uncertain, vague, or no response.	2	1	—	—	—
Sub Totals	34	6	3	2	7
			TOTAL	52	

* The number of operators citing the organization is shown in parentheses.

them. The most common reasons, shown in the table, for citing the F.U.A. was that the ideas gained from the F.U.A. were directly applicable to the farmers' own operations, that it facilitated contact with the best local farmers and good speakers, and that it was useful as a pressure group. Just how the F.U.A.'s function as a pressure group was related to its usefulness as a source of ideas and good contacts for these early adopters was not explicit, however. Farmers may have perceived that improvements in their operations were dependent on collective attempts by the F.U.A. to improve their lot.

While 93 farmers indicated that they belonged to the F.U.A., 25 farmers, or 27 per cent of those belonging to it considered it useful to them in some way. However, the F.U.A. as a general-purpose farm organization appeared to be unable to meet the needs of a variety of local farmers. External farm organizations met the social and informational needs of some farmers. Seven farmers each belonged to one external organization; four belonged to two external organizations each. These organizations (such as the Western Stock Growers' Association, or purebreed livestock associations) were considered most helpful because of the publications they produced, the applicability of ideas obtained from publications, and contact with other similar-minded farmers at conventions, exhibitions or special events.

B. Participation in Formally-Structured Local Organizations

The main reason for examining the involvement of the adoption leaders in local formally-structured organizations is that social participation and competence as a farmer appear to be correlated, according to previous research. Rust found that,

> Whenever farmers... have been elected to some responsible position in the community it is probable that many of these abilities are directly or indirectly related to farm managerial ability.... The acquiring of new knowledge or the acceptance of responsibility are... related to levels of managerial ability.[20]

This study examined the decision-making experiences of adoption leaders, as indicated by executive positions held in local organizations, and the degree of attendance in them. Ninety-three farm operators in the sample were members of the Farmers' Union of Alberta. Eighty-one farmers in the F.U.A. were members only, while twelve previously held, or were holding at the time of the study, executive positions in the organization. The F.U.A. provided, then, executive experience for about thirteen per cent of the farm sample. Attendance and executive experience in the F.U.A. were highly related, not only because executives were expected to attend regularly but because they appeared to show a greater sense of responsibility toward their organization than ordinary members. One hundred per cent of those holding executive

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[20] R.S. Rust, "Form Survey Data Relationships with Managerial Ability". Economic Annalist, Vol. 33, April, 1963, p. 33.

positions at some time, said they attended F.U.A. meetings regularly. The attendance of the general membership was more variable with only sixty-six per cent of F.U.A. members reporting regular attendance. This pattern of executive experience and regular attendance at the meetings and social functions of organizations was generally true for all local organizations. The discussion of organizations and clubs that follows will no longer deal with attendance and the degree of commitment as reflected by executive experience.

Of the seven farmers who were still directly involved in the work of a 4-H Club, primarily a farm youth organization, three served as club leaders.

Sixteen farmers in the sample were members of the Agricultural Advisory Board for the County of St. Paul. In the sense that they serve as an advisory group to full-time agricultural advisory personnel in the county (such as the district agriculturalist, or the agricultural fieldman) this group of farmers has gained executive, decision-making experience. Because members of the Agricultural Advisory Board are appointed by the local district agriculturalist, agricultural fieldman and district home economist, their appointment may be an indication that they are already influential in legitimizing farm practices in their local communities or are potentially good legitimizers. Nevertheless, only the prime adoption leader (Figure 9), and one other farmer previously presumed to be a sanction leader (Figure 10) were members of this board. It appeared that

the appointment of members to this board was more of an attempt to secure representation from the various farming communities in the county than an attempt to secure legitimation for practices or innovations proposed by agricultural officials in the county.

A formerly more active organization, the St. Paul Agricultural Society, was named by four farmers as an important local society. Three of the four members indicated that they had gained executive experience in the organization. Two of the farmers in this society were previously designated local "sanction leaders" by the writer. (This society may have been more prominent in the past in sanctioning local farm practices; the Agricultural Advisory Board, which also had two members who were designated as sanction leaders, appears to have largely superseded local agricultural societies.) Executive experience, then, may reflect a desire on the part of adoption leaders not only to contribute their managerial abilities to local organizations but also to sanction farm practices through decision-making in these organizations.

Other local organizations, like consumer and marketing cooperatives, seed cleaning plants and grain-drying syndicates, were important avenues for utilizing the decision-making talents of local farm adoption leaders in serving customers. Thirty-one farmers indicated that they were involved in cooperatives (an average of two cooperatives each) either as members, board members, or delegates. Twenty-six

obtained executive experience in cooperatives. Six farmers had served in executive capacities in seed cleaning plants and three had done so in grain-drying syndicates.

Fifteen farm operators interacted socially with people in towns and villages through membership in a Chamber of Commerce or a Board of Trade. Only one of the farmers had executive experience in a Chamber of Commerce; he was also designated a sanction leader previously. Additionally, three other farmer members of these organizations were previously considered sanction leaders by the writer. If these fifteen farmers, through their participation in the organizations mentioned symbolize "mass society status", adoption leaders may have a tendency to view themselves as "farm businessmen", equal in status to, and having no essential communication problem with, "town businessmen".

The contrasts in personal and farm characteristics between the group of adoption leaders who were members of Chambers of Commerce or Boards of Trade and non members are shown in Table 7. With the exception of age, the contrasts are apparent in all other categories. A higher level of educational attainment and the receipt by members of more magazines than non members may indicate a cause-and-effect relationship. Moreover, higher education and subscriptions to magazines may symbolize the prior acceptance of influences from the mass society. Such influences may not only facilitate a greater awareness of innovations which are applicable to farming in the study area, but may ultimately facilitate

TABLE 7 - DIFFERENCES IN PERSONAL AND FARM CHARACTERISTICS BETWEEN MEMBERS OF CHAMBERS OF COMMERCE AND BOARDS OF TRADE AND NON MEMBERS

Personal Characteristics

	Number of Farmers	Average Age	Average Grade Completed (in years)	Average of Additional Education Obtained (in years)	Average Number of Magazine Subscriptions
Members*	15	42.9	9.9	.7	7.1
Non Members	90	43.1	8.6	.2	4.1

Farm Characteristics

	Average of Improved Acres Owned and Rented	Type of Farm Economy			Gross Income** (in thousands of dollars)							
		Grain Farming	Mixed Farming	Bee-keeping	over 20	17-20	14-17	11-14	8-11	5-8	3-5	under 3
Members	1273	40.0%	60.0%	--	60.0%	13.3%	6.6%	6.6%	13.3%	--	--	--
Non Members	718	2.2%	96.7%	1.1%	41.6%	12.4%	13.5%	19.0%	7.9%	4.5%	1.1%	--

* Thirteen farmers belonged to Chambers of Commerce; two belonged to a Board of Trade.
** Income shown for members does not equal 100 per cent because of recurring decimals. Total for non members equals 100 per cent.

rationalization in local agriculture. The larger number of improved acres for members, devoted to a much greater extent to the production of grain, may indicate that specialization has helped to free some farmers for participation in local town-based activities of Chambers of Commerce or Boards of Trade. A higher level of income for members may indicate, once more, economic freedom to join business or other organizations. Higher assets, as shown by cultivated acreage and gross income may, too, create no apparent status differences between farmers and businessmen. However, the relationship of personal and farm qualities to membership in local business organizations such as the Chamber of Commerce requires further study.

Twenty-seven farmers in the sample mentioned an affiliation with an average of about one religious or fraternal organization such as the Knights of Columbus, Elks, or Masons. Nine of these gained executive experience through such an affiliation. Six mentioned specific sports or social clubs; executive experience was gained here by two.

Eleven farmers were participants in county or municipal politics in a total of thirteen positions. Three served in administrative positions as county councillors, four served on school board committees, and one was a local director of a political party.

Thirty-four farmers were members or executives of an array of other organizations, clubs, or associations, collectively totalling forty-two. These forty-two member-

ships provided twenty-seven executive positions for the adoption leaders.

C. Participation in Other Formal Events

Formal local workships, demonstrations, field days and meetings about agricultural topics increased the social and professional involvement of the adoption leaders. The Alberta Department of Agriculture was the largest single sponsor. It attracted fifty-seven of the adoption leaders to its events, usually held in or near St. Paul, during the last two years. On average, members of this group each attended 1.4 Department of Agriculture educational events during this time.

Commercial educational or promotional events in the area, usually sponsored by farm machinery companies or fertilizer dealers, attracted each of fourteen early adopters to an average of about 1.3 events during the past two years.

Seven farmers were either sole sponsors, or sponsored jointly with machinery or fertilizer companies, field days or demonstrations that may have helped to increase local knowledge about innovations in farm machinery or fertilizer use. A total of four farmers in the sample served as speakers at agricultural meetings, speaking about either land-clearing practices or the production of grain, hogs, or beef cattle.

D. Assessment of the Patterns of Social Participation

In examining the patterns of formal social participation

by the adoption leaders in the County of St. Paul two significant social motives appeared to be at play. Contacts with others reflected both gregariousness and a desire to learn and practice executive or managerial roles. The two roles are really complementary. Both are essential if, as Rust implied (above, page 83) they provided farmers with new perspectives to the solutions of their farm problems, or increased their awareness of innovations.

It is significant that a considerable group of early adopters indicated that they interact locally with people in towns and villages, primarily through involvement in cooperatives, religious and fraternal organizations and Chambers of Commerce. By so doing, they probably tend to develop values of the mass society more readily and to view their farming operations in terms of management and efficiency, in ways similar to those of some successful local businessmen.

While there appears little doubt that informal, interpersonal contact is the most effective means of communicating information about innovations or agricultural adjustments to farmers in the study area, formal social contacts and formally structured events are valuable. More farmers in the area can be served by the latter means even though communication often tends to flow one way and not to be directly relevant to the individual farmer's immediate situation. In theory, modern transportation and communications make a large formal event (albeit often impersonal) more

accessible to more farm people. Attendance at formal educational events may provide a yardstick for measuring the level of concern about solving farm problems and may serve as a guide to the follow-up extension activities required for agricultural advisers in the study area.

Many of the adoption leaders, because of their executive training, gained from participation in the formal social structure, have become a group of valuable farm leaders. They may influence other farmers of similar status to adopt modified values and goals, primarily in viewing agriculture in business terms. However, the influence of the adoption leaders on the lower orders of farmers in the county lies outside the scope of the present study.

CHAPTER IV

INNOVATIONS ADOPTED IN THE STUDY AREA

The primary emphasis in the examination of innovations that were adopted in the County of St. Paul was on innovations that had consistently been recommended to farmers by professional agricultural advisers, usually the local district agriculturalists, during the last thirty years. The majority of farmers revealed that the adoption of seven innovations had been consistently encouraged in the study area by district agriculturalists. These seven were:

1. Farm business analysis
2. Specialization
3. Trash-cover farming
4. Chemical weed sprays
5. Commercial fertilizer
6. Systematic rotation, and
7. Automated hog barns.

The first six innovations had been generally recommended throughout the last thirty years, the last during the past few years.

These seven innovations were examined, primarily, in terms of selected personal and farm characteristics of two groups, adopters and nonadopters. Many other practices or innovations that were not consistently recommended by district agriculturalists were incorporated in the study if farmers mentioned their use.

A secondary emphasis in the study of innovations was on the comparative numbers of farmers who had adopted innovations during two time periods. Long-established innovations were considered to be those that had been adopted ten to thirty years ago, that is, roughly 1939 to 1959; recent innovations were those adopted during the last ten years, that is, during the decade prior to the study in 1969. Farm practices that had been discontinued were also noted.

Most of the information that was obtained about innovations depended on farmers' memories. Because of the general absence of detailed, historical records of innovations adopted in the farm operations in the county, some of the information provided by the adoption leaders may have been inaccurate and incomplete.

Mechanization has been responsible for many of the changes brought about in farm practices in the county. The farmers in the study sample generally equated "mechanization" with "innovation" although many innovations such as the use of farm accounts, or farm management (used in its broadest sense), reflect values and a philosophy of farming that may have little relationship to mechanization per se. In some cases it was apparent that the general effects of mechanization were considered to be innovations in themselves. For example, increase in farm size or cultivated acres per farm operation were sometimes referred to, animatedly, as innovations in their own right. As well, in-

creases in the number of animals owned (that is, quantity) were often considered to be proof of innovative farming; quality of animals or husbandry procedures appeared to be a lesser consideration.

The study of farm innovations has geographical significance in that the land-use patterns which have emerged in the county reflect the farm practices that have been adopted. To Pred, it is significant that

> land-use patterns are... the end product (or geographical expression) of a large number of individual decisions made at different times for often very different reasons (or perhaps for no adequate reason at all).[1]

This study can provide only clues to the land-use patterns in the County of St. Paul as only a fraction of the farmers have been studied. The clues, however, are significant in that they signify the types of agricultural adjustments that the most innovative farmers are making in the area.

Broad categories of farm practices such as management, specialization and mixed farming, tillage, seeding, maintenance of soil fertility and weed control, and innovations in haying, grain harvesting and livestock enterprises were examined. These innovations not only reveal a part of the historical evolution of farming in the area but serve as

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[1] A. Pred, Behavior and Location, Foundations for a Geographic and Dynamic Location Theory. Department of Geography, The Royal University of Lund, Sweden, 1967, p. 81. Pred's citation is from Harvey, 1966.

the basis for assessing the extent to which offically-recommended practices have been adopted in the area, and the extent to which non-recommended practices persist, even in those farm operations locally deemed most innovative.

I. OVERALL MANAGEMENT, SOME BUSINESS ASPECTS OF FARMING

Three yardsticks were used to assess the extent to which each farm operation was viewed by the farm operators as a business enterprise: (1) the use of farm records and accounts, (2) performance testing and nutritional testing of feed, and (3) the kind of specialization adopted in livestock enterprises.

A. Farm Records and Accounts

Ninety-two operations in the study sample of 105 kept rudimentary records. Records and accounts were considered rudimentary if they were compiled on a once-yearly basis and were used primarily for income tax and general taxation purposes. Even though an accountant or bookkeeper was occasionally hired by some of these ninety-two operations, records generally provided little insight into the business aspects of farming. Primarily, an analysis of the overall strengths and weaknesses, or profitable and unprofitable inputs and outputs, in the operations was missing. Some farmers indicated, however, that they felt they carried out

a fairly thorough analysis of their farm operations even though they consulted only infrequently with professional analysts such as a district agriculturalist or farm economist, or both. Eighty-four operators in this group indicated that yearly stock-taking was a long-established practice while eight recently began the practice.

Eleven operations were geared to various systems of farm record keeping and farm business analysis. Five of these indicated that business analysis was a long-established practice; six adopted a system of analysis recently. This group of eleven kept records on a regular weekly or monthly basis following a method prescribed by district agriculturalists and agricultural economists, or the Department of Veterans' Affairs, the Farm Credit Corporation or other money-lending agencies that had an interest in farmers' operations.

Two farm operators indicated that they kept no farm records whatever. One of these indicated that he kept records "in his head" while the other said he did not know how to keep records.

Table 8 shows that adopters and nonadopters of farm business analysis contrast in a few significant personal and farm characteristics. As a group, adopters are somewhat older and slightly more educated than nonadopters. Adopters of farm business analysis utilize smaller improved acreages of land than nonadopters (671 to 813). Adopters of farm business analysis are less specialized in beef cattle than

TABLE 8 - ADOPTERS AND NONADOPTERS OF FARM BUSINESS ANALYSIS

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Improved Acres	Specialized in: Beef Cattle	Hogs	Grain	Bees	Mixed Farming
Adopters	11	46.1	9.0	671	18.2%	9.1%	9.1%	0.0%	63.6%
Nonadopters	94	42.7	8.7	813	29.8%	8.5%	7.4%	1.1%	53.2%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	11	27.2%	36.4%	0.0%	18.2%	18.2%	0.0%
Nonadopters	93	46.2%	9.7%	14.0%	17.2%	7.5%	5.4%

nonadopters. Adopters are more likely to be mixed farmers. A higher per cent of nonadopters receive higher gross incomes, above $20,000, than adopters. However, percentage incomes for both groups vary in the other income categories. Nevertheless, no adopters of farm business analysis receive a gross income of $8,000 or less.

It appears anomalous, from the evidence shown in Figure 8, that the larger farm operations (measured in improved acres) receive a larger percentage of the highest gross incomes without having adopted farm business analysis. While the two characteristics may appear anomalous, they may actually constitute a cause-and-effect relationship. Many of the farmers who have been accustomed to receiving high gross incomes may have never felt compelled to adopt farm business analysis. For the nonadopters, farm success may be measured in terms of certain signs of achievement such as large farm size, net worth, or gross income, and not necessarily in terms of an economic input-output analysis of the farm operation.

Although accurate record keeping and regular analysis of a farm operation are significant aspects of farm management, they are also important indicators of managerial ability where they are regularly used by the farm operator to guide decision making. It is noteworthy that despite the efforts of agricultural extension services to implement fairly detailed record keeping, few farmers in the study sample have been influenced by their appeals. A few farm

operators indicated that the type of record keeping agricultural advisory personnel suggested they adopt was too time consuming, ambitious and pretentious. It was indicated previously (above, Chapter II, Part II.C.) that certain local values and norms may work to resist the adoption of farm business analysis procedures, at least in the form suggested by agricultural advisory agencies. (Farm record keeping and business analysis will be further examined below in Chapter V).

B. Performance Testing and Nutritional Testing of Feed

Performance testing of livestock to determine the rates at which animals gain weight for a given intake of feed was practised by six beef producers in the study sample. For one operator this was a long-established practice; for five it was a recent innovation. Another beef producer discontinued this innovation when he sold his entire herd of beef cattle in 1969.

Additionally, two dairy producers regularly kept detailed records of butterfat production and total yearly milk production records of individual cows. Such information was used to cull out poor dairy cows from dairy herds and as a basis for selecting quality breeding stock. One producer of purebred swine used a record of performance (R.O.P.) method of appraising the commercial qualities of his purebred swine. This was a long-established practice in his operation, the adoption of the method being largely responsible for gaining

numerous prizes and championships for his breeding stock.

Nutritional analysis of livestock feed was an innovation adopted by four farmers. For one this was a long-standing practice while for three it was a recent innovation. All four also performance tested their livestock. They considered the two innovations complementary.

A very small number of livestock producers in the study sample adopted performance testing and nutritional analysis of livestock feed. This is an indication that outdated trial-and-error methods of selecting livestock for breeding purposes and herd improvement and feed for animal nutrition are still prevalent in the County of St. Paul. Undeniably, traditional methods of culling unproductive animals may serve the purposes of most farmers well, but these methods may often have little scientific basis. Most apparent is the fact that "eyeball" methods cannot be used to determine the nutritional deficiencies of feed for cattle. Costly, sometimes even unnecessary, feed supplements may be purchased with no scientific basis for their use.

C. Specialization in Livestock

It was shown in Chapter III that the study sample was predominantly comprised of mixed farming operations (96 of 105 operations). Since the frost hazard for growing grain crops is relatively high (Figure 4), mixed farming with an emphasis on the production of grass, legumes and feed grain and one or more kinds of animals appears to be a reasonable

type of adjustment to the farming hazards in the area. Diversification of agriculture in the St. Paul area in response to the frost hazard is but one factor in the farm economy of the region, however. While the value of specializing in grain production is questionable (eight operations specialized in grain), the attempt to produce two or three types of farm animals, namely beef cattle, dairy cattle or hogs, may not be warranted in economic terms. Capital outlays in order to obtain modern buildings and automated equipment to increase efficiency in raising one type of animal may be justified. To attempt to become, however, an efficient producer of grain and fodder in addition to producing two or more types of animals would require capital outlays on equipment and buildings in each enterprise that may not be economically justifiable, considering the small scale of many of the operations (Figure 7).

A breakdown of farm operations raising beef cattle, dairy cattle, and hogs, which constitute the three major sources of income from livestock, revealed that nineteen of the operations still rely heavily on all three of these animals. Eighteen of these nineteen operations have had a long-standing primary reliance (going back 10 to 30 years) on these three sources of income as well as secondary dependence on the sale of some grain, poultry or poultry products. One operation recently began to diversify its sources of income by relying on the sales of beef cattle, dairy products and hogs. Thirty-eight operations raised only two

kinds of farm animals. It is questionable whether the continuation of some of these mixed farming enterprises during such a long period of time has always been profitable considering the changes that have occurred in production costs and prices of beef, dairy products and pork. Persistence in mixed farming cannot be considered innovative farming behavior if it has precluded the establishment of specialized, more efficient operations.

"Specialization", if the production of only one kind of farm animal in addition to grain and fodder can be termed specialization, at the time of the study was carried out by only thirty beef producers, nine hog producers, and no dairymen. The above definition of "specialization" will be used in subsequent discussions. Additionally, eight producers of grain (but no livestock), and one beekeeper are specialized operators. The remaining fifty-seven farm operations will be referred to as mixed farming operations because they produce grain and fodder and two or more farm animals.

Table 9 indicates that farmers who have specialized in the production of either beef cattle, hogs or grain (one beekeeper owned no cultivated land) have considerably larger farms than nonspecialists or mixed farmers (922 acres to 696 acres, respectively). Adopters of specialization, as a group, receive a higher percentage of the high incomes ($20,000 and above) than do nonspecialists. Whether specialization has resulted in the receipt of higher incomes or

TABLE 9 - ADOPTERS AND NONADOPTERS OF SPECIALIZATION

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Improved Acres	Specialized in: Beef Cattle	Hogs	Grain	Bees	Mixed Farming
Adopters	48	42.7	9.1	922	62.5%	18.7%	16.7%	2.1%	0.0%
Nonadopters	57	43.3	8.5	696	NOT APPLICABLE				100.0%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	48	60.4%	10.4%	2.1%	18.8%	8.3%	0.0%
Nonadopters	56	30.4%	14.3%	21.4%	16.1%	8.9%	8.9%

whether higher incomes have facilitated the adoption of some degree of specialization is debatable. Nevertheless, if specialization and high income are correlated, it can be argued that more specialization will need to occur if the goals of rationalization in agriculture and doubling production, as set out by The B-12 Plan, are to be attained in the study area.

In addition, discontinuing an unprofitable livestock enterprise is also an indication of managerial acumen. As a group, the thirty "specialized" beef producers previously discontinued a total of eleven hog operations and four dairy operations, an average of one discontinuance for every two operations. Similarly, the nine "specialized" hog producers previously discontinued four beef cattle operations and one dairy operation, an average of approximately one discontinuance for every two operations.

It should be apparent that persistence in managing a variety of livestock enterprises in the study area may not be an economically sound practice. Specialization to some extent may prove more profitable. McBain and Petersen elaborate:

> ...choice and combination of enterprises can often spell the difference between farm success and failure ... a man carrying a large number of enterprises ultimately [will] find them competing for the use of his labour and management to the point where each suffers, resulting in low total farm income.[2]

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[2] B.J. McBain and T.A. Petersen, Alberta Mixed Farm Production Cost Studies, 1951-1955. Alberta Department of Agriculture, 1955, p. 23.

Selecting the most profitable livestock specialty or enterprise combinations in the study area is probably one of the most significant problems of farm management which faces both agricultural extension officials and farm operators. The managerial objective of some form of specialization appears simple but has yet to be practised by the majority of the best farmers in the County of St. Paul. Clearly, for business-minded farmers in the area the managerial "objective in analyzing enterprise combinations [should be] to determine whether resources diverted from one line of production to another would give an increase or decrease [in] income".[3]

II. INNOVATIONS ADOPTED IN A VARIETY OF FARM OPERATIONS AND ENTERPRISES

Farm operators in the County of St. Paul were asked to describe the kinds of practices they adopted in their farm operations. Recommended and non-recommended practices were noted as the farmers described their tillage, sowing, weed control, haying and grain harvesting methods as well as the ways in which they maintained soil productivity. Innovations adopted in the primary livestock enterprises in each farm operation were described.

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[3] L. Bauer, 1966 Alberta Farm Business Report. Alberta Department of Agriculture, 1967, p. 59.

A. Tillage and Sowing Practices

Agricultural extension personnel, machinery companies and the mass media have been recommending, during the past few decades, trash-cover farming as a desirable means of retaining more soil moisture, preventing soil erosion and returning valuable fibre and soil nutrients, as trash decomposes, to the soil.

Eighty-nine farmers, of the 104 in the sample who cultivated land, reported that they had adopted tillage methods that resulted in the retention of a trash cover (crop and weed residue) in their fields. However, what was sometimes reported as trash cover in fields was in reality trash that was largely incorporated below the surface of the soil, as revealed by spot checks. Most farmers appeared to be aware of the advantages of a trash cover but the use of the practice was quite variable even on individual farms. Burning of the heaviest stubble and swaths from the previous harvest was observed in a few instances during the spring of 1969. The local norm which guided the actions of some farmers appeared to be: burn or bury all trash so that a field is free of as many potential encumbrances to subsequent tillage and seeding as possible.

While eighty-nine farmers retained some trash cover through the use of various cultivators, serrated, one-way or double discs, eleven specifically reported using mouldboard plows to varying extents. The use of mouldboard plows, which serve to bury trash, appears to add credence to the

traditional norm cited above. However, only two farmers reported burning heavy straw cover periodically on their fields, preferring a clear surface prior to plowing the soil.

Many of the farmers used various means of tilling the soil — cultivators, discs, or mouldboard plows — depending on the compactness of the soil or moisture conditions, irrespective of the amount of trash cover that would be retained at the surface or incorporated at deeper levels.

Table 10 shows that adopters and nonadopters of trash cover farming are almost identical in the personal characteristics of age and education. Farm sizes of adopters are somewhat higher. Significantly, adopters of trash cover emphasize specialization in beef cattle and wheat production more than nonadopters. The pattern of wheat growing and the adoption of trash cover is not peculiar to the study area; wheat growing areas in North America have increasingly come to rely on trash cover as a means of conserving moisture, retaining soil structure, and preventing the worst effects of erosion. The use of combines for harvesting grain has contributed to the retention of crop residue on fields. All farmers in the study sample who used trash cover combined their crops. The use of greenfeed and the traditional practice of using threshing machines have had the effect of removing much of the potentially valuable crop residue from fields, hence precluding the establishment of an effective trash cover system. There was practically no difference between adopters and nonadopters in

TABLE 10 - ADOPTERS AND NONADOPTERS OF TRASH COVER FARMING

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Improved Acres	Crops Raised: Hay and Legumes	Crops Raised: Feeds Grains	Crops Raised: Wheat	Use of: Grain Combine	Use of: Threshing Machine & Greenfeed	Use of: Summerfallow	Specialized in Beef Cattle
Adopters	89	43.5	8.8	804	87.6%	96.6%	42.7%	100.0%	0.0%	65.0%	96.7%
Non-Adopters	15	42.8	8.9	763	86.6%	93.3%	26.6%	80.0%	20.0%	66.7%	33.3%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	88	46.6%	11.4%	12.5%	19.3%	9.1%	1.1%
Nonadopters	15	26.6%	20.0%	13.3%	6.6%	6.6%	26.6%

their reliance on summerfallowing, primarily as a method of conserving moisture for subsequent crops. While 46.6 per cent of those adopting trash cover reported gross incomes of $20,000 and above, only 26.6 per cent of the nonadopters received income at this level. Specialization in beef cattle (96.7 per cent for adopters, 33.3 per cent for nonadopters) appears to explain the higher incomes received by adopters of a system of trash cover than by nonadopters. Again, the cause-and-effect relationship of adopting trash cover and receiving high incomes appears to be borne out by the evidence in Table 10. The corollary of the above appears to be true: nonadopters, presumably because they did not adopt trash cover (or had smaller operations or depended less on sales of beef cattle) received the lowest levels of income reported in the study sample.

The major ways of tilling the soil in the county produce various effects on the land. Mouldboard plows and discs tend to destroy the soil structure and cloddiness of the soil, pulverizing it and leaving it exposed to subsequent wind and water erosion if aridity, excess surface runoff or sloping land are present. Little evidence of such erosion, resulting from soil mismanagement was found, however.

Deep tillage and other cultivators, if tractor speeds are carefully controlled and if tillage to control erosion on slopes is practised, can be used effectively to retain a trash cover along with good soil structure and moisture.

Those farmers who used deep tillage cultivators indicated that this farm implement, next to commercial fertilizer, was most responsible for improved grain yields in the area. This was because of the better soil moisture conditions which accompanied a trash cover. Grain yields were more predictable and not entirely at the mercy of the infrequent dry seasons in the area because of this significant innovation in tillage. Fifty-three farm operations have used this innovation to varying extents for over ten years. Thirty-six have used it for less than ten years.

Grain-sowing practices are also an important aspect of soil management. Although packing of soil after sowing has been a long-standing recommended practice, its use in the study area was reported to be variable. Packing after seeding has become even more essential in recent years as more trash cover has been retained in the study area, especially where large quantities of straw from the previous harvest are available.

Thirty farmers reported that they regularly used a press drill, specifically designed for packing sown soil. For sixteen of these farmers it was a long-established innovation and a recent one for fourteen. Additionally, nine farmers recently adopted hoe drills, usually with a rod-weeder attachment. The hoe drill and rod weeder were effective in most trash-covered fields, in the estimation of these farmers. Two operations, seeding and weed control, were considered the main advantage of this sowing method

over the press drill or more conventional double-disc drill.

Double-disc seed drills, less costly than the above two seeding implements were reported in use by the remaining farmers. Many rationalized their continued use on the basis of cost alone. Some indicated that these seeding implements were not as easily damaged by stones and could still be used effectively even in heavy trash cover. Often, however, packing did not accompany the seeding operation with the double-disc drill.

B. Weed Control

A variety of methods was used to control weeds in the study area. Four basic methods were reported: (1) use of chemical weed sprays, (2) summerfallowing, (3) rotation, and (4) use of a rod weeder. Many farmers used more than one of these methods. Two operations used all four of the above to varying extents. Twenty operations used the first three methods almost exclusively. The remainder used one or two basic methods.

Seventy-three operations used chemical weed sprays, fifty-nine of these reporting their use as a long-established practice and fourteen as a recent innovation. The relatively small expense involved in their use, and their visible effectiveness in controlling weeds, were common reasons cited for the use of chemical weed sprays. No discontinuance in the use of chemical weed sprays was reported.

In Table 11, the personal characteristics of age and

TABLE 11 - ADOPTERS AND NONADOPTERS OF CHEMICAL WEED SPRAYS

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Improved Acres	Alternative Means of Weed Control in Use		
					Summer-fallow	Rotation	Rod Weeder
Adopters	73	43.8	8.8	830	72.6%	46.6%	8.2%
Nonadopters	31	41.7	8.8	722	48.4%	61.3%	6.5%

Gross Income

(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	73	45.2%	12.3%	15.1%	16.4%	8.2%	2.8%
Nonadopters	80	40.0%	13.3%	6.7%	20.0%	10.0%	10.0%

grade appear to have no bearing on the adoption or nonadoption of chemical weed sprays. However, adopters of chemical weed sprays have, on the average, larger improved acreages. Adopters tend to complement the use of chemical weed sprays with summerfallow, rotation and the rod weeder, in that order. Despite the relatively low cost of using chemical weed sprays to control weeds, the more expensive method of summerfallowing is still popular, although its use appeared variable. Summerfallowing has been the traditional practice in controlling weeds (and restoring some soil fertility or conserving moisture). Its use appears largely unjustified considering that the cost of using chemical weed sprays is low, and considering that the study area experiences infrequent droughts. While adopters of chemical weed sprays practised summerfallowing as the best alternative method of weed control, nonadopters of chemical weed sprays relied, primarily, on a system of rotation to control weeds. To nonadopters of chemical weed sprays, summerfallowing was less important as a means of controlling weed growth because a grass-legume-grain rotation had the effect of controlling or eliminating weed growth. High gross incomes and the adoption or nonadoption of chemical weed sprays are not clearly related, according to Table 11. Low incomes appear to relate more directly to the nonadoption of chemical weed sprays. However, the relationship of income to the adoption or nonadoptoin of chemical weed sprays may not be too significant if other means of maximizing per-acre output (commer-

cial fertilization, rotation) are considered. Chemical control of weeds is still only one means of maximizing output per acre, albeit an important means.

Sixty-eight farm operations reported the use of summerfallowing as an effective means of weed control. For twenty-four it was a long-established regular practice. Forty-two still used some summerfallowing, not necessarily with any regularity. Two had recently adopted the practice (on a limited basis to control weed growth in a few fields), while six discontinued its use entirely. Summerfallowing, its purpose being to control weeds and to conserve moisture, appears to be popular in the study area. Nevertheless, the Alberta Farm Guide specifically states that "on black or grey wooded soils fallowing for moisture storage is not necessary because of greater rainfall and less evaporation. In these soil areas, fallowing should be practised only for weed control or when breaking sod crops".[4] Some operators reported that they summerfallowed for an additional reason: to restore some fertility to depleted wooded soils, especially. This reason appears to have no sound economic basis. Chemical or other methods of weed control are less costly than the "cost" of summerfallowing land that is non-productive for a year.

A system of crop rotation involving legumes and/or

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[4] Canada and Alberta Departments of Agriculture, Alberta Farm Guide. No. 000-30M, 1967, p. 28.

grasses followed by a few years of grain crops, usually oats or barley, was cited as the third common method of weed control by fifty-three farmers. For thirty-two farmers some form of rotation was long established and assisted weed control while for twenty-one it was a recent practice. One discontinued the practice when he discontinued livestock production. Farmers who used the method said that chemical weed control was often not necessary as weeds from fields were removed in a green stage of growth along with a legume or grass crop.

The use of a rod weeder was reported as a recent mechanical means of controlling weeds. One operator used this means for ten years while seven used it for less than ten. The use of the rod weeder, besides helping to control weeds, may create other beneficial effects (whether the farm operator intended that these occur or not). Trash cover is most effectively retained at the surface by the use of the rod weeder. The Alberta Farm Guide shows the comparative ability of various tillage machines to reduce surface trash cover by the following percentages each time the machine is used:

Rod weeder.....	0 to 10 per cent
Wide-blade cultivator.....	5 to 10 per cent
Heavy-duty cultivator.....	15 to 25 per cent
One-way disc and discer.....	40 to 60 per cent.[5]

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[5] Ibid., p. 25.

An innovation like the rod weeder, then, may produce two desirable effects, retention of trash and removal of weeds.

C. Haymaking Innovations and Silage

Seventy-eight operators reported that they made either hay or silage. A total of 66 operations used hay balers. This is 84.6 per cent of the sample of 78 who made hay. Fifty-eight said the baler was a long-established innovation, eight recently adopted the baler, and four discontinued its use. Two operations of the 58 reduced the amount of manual work involved in handling bales by utilizing a bale thrower and a bale wagon. The remainder used bale stookers, conveyers, front end-loaders and various improvisations to avoid much of the manual work involved in handling bales.

Six operations, or 7.7 per cent of all operations making fodder, used a forage harvester for making silage. For two operations, silage making was a long-established practice. For four it was a recent innovation. Three operations discontinued the use of silage. A forage harvester is a much more costly innovation than a hay baler. Silage, however, offers at least six advantages over traditional haymaking:

(1) It can be made in weather unsuitable for the making of good hay;

(2) Field losses are low because leaves do not shatter readily and there is less exposure to weather;

(3) It will keep indefinitely if properly stored;

(4) It provides a succulent feed for winter;

(5) Weedy crops or other material which animals would reject as hay can be utilized as silage; and

(6) There is less fire hazard with silage than with hay.[6]

The above reasons suggest that silage is an important way of maximizing the output of fodder in a farm operation and of improving the quality of feed for cattle.

The six remaining hay-producing operations, or 7.7 per cent of the total, utilized other means of handling hay. Manual stacking and handling of hay was in use by two operations, two used front-end loaders to handle loose hay, and two used another type of hay harvester to pick up and pile hay. Only the last means of making hay might be considered an innovation.

D. Grain Harvesting and Drying

All but three of the 104 farm operations that produced crops utilized swathers and self-propelled or pull-type grain combines to harvest their crops. For 76 operations this system of harvesting has been used for over ten years; for 25 it is a recent innovation. One feedlot operator who produced greenfeed only needed neither of these machines. Two of the 101 operators who swathed and combined their crops also used a grain binder and threshing machine for harvesting part of their crops. Two operations used a grain binder and threshing machine for harvesting all their grain.

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[6] D.G. Bratvold, Silage in Alberta. (Introduction), Alberta Department of Agriculture, No. 127-52, Edmonton, 1966, p. 3.

Efficiency and lower labour requirements in using grain combines have made them readily acceptable to the adoption leaders in the area. One farmer reported using a straw cutter attachment on his combine to shred and spread straw that was needed on his grey-wooded soil.

Eleven farmers said they used grain dryers regularly during the past two harvest seasons because of the damp or tough condition of harvested grain. One of these farmers said that he had used grain dryers for over ten years.

E. Methods of Mantaining Soil Productivity

The presence of readily-depletable wooded soils in the County of St. Paul (Figure 2) has made the more innovative farmers conscious of the need to maintain or to improve productivity of their cultivated land. Taken as a group, farmers in the study area perceived that the productivity of their soil was maintained or increased through the use of four methods: fertilization with commercial fertilizers, a system of crop rotation, summerfallowing, and major applications of barnyard manure. Most operations used more than one of these methods.

1. Commercial Fertilizer

Seventy-nine farm operators who raised grain, grass or legume crops used commercial fertilizer. The amount and kind of fertilizer used was based on the farmers' experiences with commercial fertilizer. Sixty-nine farmers, or 87.7

per cent of this group, said the use of commercial fertilizer was a long-established practice. Ten had recently adopted it. One farmer discontinued its use.

In Table 12 the characteristics of adopters and nonadopters of commercial fertilizer are shown. The adopters are somewhat older, have completed slightly more education and have much larger improved acreages than nonadopters. It may be that farmers become more deeply convinced of the benefits of using fertilizer once their farms become larger and as they specialize more in grain production, or see the need to maximize output per acre. Both the adopters and nonadopters depend almost equally on systematic rotation as either a complementary or alternative way of maintaining or increasing soil productivity. It is significant that the adoption of one innovation, the use of commercial fertilizer for grain crops has led to the adoption of another innovation, the use of commercial fertilizer for hay and legumes. Both serve as ways of maximizing output per acre. The contrast between adopters and nonadopters of commercial fertilizer is striking when income is examined. A much higher per cent of adopters than nonadopters receive incomes in excess of $20,000. The corollary, low income and nonadoption is borne out in Table 12. Since the consistent use of fertilizer suggests that a farmer has adopted the prior goal of maximizing output, and thus presumably profits, the relationship between consistent fertilizer use and high income is not accidental. If maximization is the cen-

TABLE 12 - ADOPTERS AND NONADOPTERS OF COMMERCIAL FERTILIZER

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Improved Acres	Fertilizer Applied to Hay and Legumes	Use of Systematic Rotation
Adopters	79	44.0	8.9	861	24.0%	34.2%
Nonadopters	25	41.7	8.6	598	NOT APPLICABLE	36.0%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	78	51.6%	11.4%	11.4%	16.6%	6.4%	2.5%
Nonadopters	25	20.0%	16.0%	16.0%	20.0%	16.0%	12.0%

tral goal of an entire system of farming, the use of commercial fertilizer is a significant part of this system.

Twenty-eight farmers adopted soil testing to determine which plant nutrients were required in individual fields. For most of those using soil testing, the guesswork in deciding the type and amount of fertilizer to use was largely eliminated. Commercial fertilizer dealers were mostly responsible for initiating a soil testing system. When farmers gained experience in collecting soil samples they were generally able to submit soil samples for testing without further assistance. For twenty-seven farmers soil testing was a recent innovation. For one it was long established. Most of the soil testing, however, was carried out on a limited basis since all fields were not tested.

In order to maximize the production, or livestock carrying capacity, of pastureland, hay or legume crops, nineteen adoption leaders in the sample applied commercial fertilizer, to varying extents, to their forage crops. For two operations such applications were a long-standing practice, for seventeen they were a recent innovation. Only one discontinuance in the practice was reported.

Various studies and experience have indicated that the use of commercial fertilizer is a valuable practice. The practice is especially of value in areas like the County of St. Paul with its grey-wooded soils if maximizing output on cultivated land is a goal of farm operators. Research on farming in northeastern Alberta has shown that "the ferti-

lity of most of these [grey-wooded] soils remains at a level adequate for the production of reasonably good grain crops for about ten years after breaking".[7] The Alberta Department of Agriculture has data which show that the use of commercial fertilizer on grey-wooded soils yields "profits as high as [a] twenty-fold return on each dollar invested in fertilizer".[8] Some farmers in the County of St. Paul reported similar results, usually if accurate soil sampling and testing preceded the application of commercial fertilizer.

2. Crop Rotation

Thirty-six farmers reported the use of a systematic rotation of cereal crops and legumes or grasses. The usual system appeared to be a two or three year growth of legumes and/or grasses followed by two or three years of cereal crops, usually oats and barley. Most farmers who farmed considerable acreages of grey-wooded soils recognized the value of this system. Combined with the use of commercial fertilizer it assured them of a relatively high livestock carrying capacity during the summer and sufficient winter fodder, or a year-round supply of cereal grains.

Thirty-six farm operators used systematic rotation

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[7] B.H. Kristjanson and C.C. Spence, Land Settlement in Northeastern Alberta, 1943. Dominion of Canada, Department of Agriculture, Publication 800, 1947, p. 23.

[8] Alberta Department of Agriculture, Soil Management in Alberta. No. 510, 1967, p. 30.

regularly, 21 as a long-standing practice and 15 as a recent innovation. One discontinued systematic rotation when he discontinued livestock production. Thirty-two farm operations used a system of "periodic" rotations of legumes, grasses and cereals. For 23, periodic rotation was a long-established practice; for 9 it was recent. Additionally, four farmers specifically mentioned green manuring, a kind of legume rotation, as a means of improving soil fibre or organic content in soil, soil moisture retaining capacity, as well as fixing atmospheric nitrogen.

In Table 13, systematic rotation is examined in terms of the personal and farm characteristics of three groups: adopters of systematic rotation, nonadopters, and specialized grain producers. Adopters of systematic rotation have a slightly lower average age and a slightly higher level of education than the nonadopters. On the other hand, specialized grain producers are younger, have somewhat higher education, and utilize considerably larger improved acreages than the previous two groups. The higher degree (38.9 per cent to 26.7 per cent) of dependence on specialization in beef cattle for adopters than nonadopters appears to indicate that the establishment of a system of rotation and specialization in beef cattle are complementary. The adoption of a system of rotating grasses and/or legumes and grain in effect has established a grassland-and-grain base for specialization in cattle. No specialized grain producers adopted systematic rotation largely because alternative means of maximizing out-

TABLE 13 - SYSTEMATIC ROTATION: COMPARISON OF ADOPTERS, NONADOPTERS, AND SPECIALIZED GRAIN PRODUCERS

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Acres Improved	Specialized in: Beef Cattle	Hogs	Grain	Mixed Farming	Also use: Summer-fallow	Commercial fertilizer	Chemical Weed Sprays	Rod Weeder	Trash Cover
Adopters	36	42.0	8.9	707	38.9%	5.5%	0.0%	55.5%	33.3%	75.0%	61.1%	5.5%	91.7%
Non-Adopters	60	43.7	8.6	773	26.7%	11.6%	0.0%	61.7%	53.3%	73.3%	73.3%	8.3%	81.7%
Specialized Grain Producers	8*	40.7	9.4	1344	0.0%	0.0%	100.0%	0.0%	75.0%	100.0%	85.5%	12.5%	87.5%

Gross Income

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	35	40.0%	20.0%	5.7%	22.8%	8.6%	2.9%
Nonadopters	60	43.3%	8.3%	18.3%	15.0%	8.3%	6.7%
Specialized Grain Producers	8	62.5%	12.5%	0.0%	12.5%	12.5%	0.0%

* None of the eight specialized grain producers had adopted systematic rotation.

put, primarily through the use of commercial fertilizer (100 per cent of specialized grain producers used it), chemical weed sprays, and summerfallow. As shown previously in Table 11, summerfallowing appears to serve as the popular means of controlling weed growth, hence of maximizing output. In fact, it appears in Table 13 that specialized grain producers have adopted more intensive use of not only summerfallowing but commercial fertilizer, chemical weed sprays, and rod weeders. The adopters of systematic rotation have used only one means of maximizing output — trash cover — slightly more than specialized grain producers (91.7 per cent to 87.5 per cent). Adopters of systematic rotation receive, as a group, a smaller percentage of high gross incomes (above $20,000) than nonadopters or specialized grain producers. Nonadopters of systematic rotation, including the specialized grain producers, may have received a higher per cent of the highest level of income (above $20,000) because the scale of their operations (measured in improved acres alone) is larger than that of adopters.

The evidence of research elsewhere in Alberta indicates that legumes such as alfalfa or sweet clover produce a beneficial effect on subsequent cereal crops on grey-wooded soils. The use of legumes has long been recommended. Nevertheless, the effects of legumes on grey-wooded soils are of short duration:

> Approximately 83 per cent of... fixed nitrogen was used by the first cereal crop and the remainder was used by the second crop. There appears to be little or no

carry-over of fixed nitrogen for a third cereal crop.[9] Such evidence appears to suggest, then, that many adoption leaders in the county have adhered to the recommended practice of rotating legumes and grasses with cereals every two or three years. Moreover, the farm-adoption leaders indicated that they received encouragement in adopting a grassland type of economy because the County of St. Paul paid half the cost of grass seed.

3. Summerfallowing

The value of summerfallowing as a means of maintaining soil productivity was considered questionable previously in this chapter. Suffice it to say here that it is still considered a valuable practice, in varying degrees, by 53 farmers, 51 of whom have used the practice on a long-standing basis and two of whom have adopted it recently, mainly as one means of curtailing the production of cereal grains.

4. Barnyard Manure

The practice of spreading barnyard manure on fields was used by all farmers who raised livestock. The greatest benefits from the practice accrued to those farm operators, five in number, who had the largest beef cattle feedlots or hog operations and were thus able to produce major quantities of

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[9] Canada Department of Agriculture, 1968 Research Hi-Lites. Research Station, Lacombe, Alberta, p. 22.

manure. Four feedlot operators and one producer of hogs said that the spreading of manure to improve soil fertility was significant in their operations.

F. Innovations in Major Livestock Operations

Information was obtained about innovations in the beef cattle, hog, and dairy enterprises, the major income generators for farmers in the study.

1. Beef Cattle Enterprises

Twenty-three farmers reported that they produced purebred beef cattle, fifteen of whom said it was a long-established practice while for eight it was recent. One discontinued raising purebred beef cattle. Sixteen operators carried out a cross-breeding program primarily, they indicated, to obtain hybrid vigor and faster-growing stock. For eleven of these operators the practice was long established; for five it was recent. Four beef producers recently changed to larger, heavier imported breeds of cattle largely in response to a changed emphasis in carcass grading. Charolais cattle, imported from France, constituted the major new addition of heavy breeding stock to the area. As yet, only one beef producer used artificial insemination on a long-term basis to upgrade his beef-cattle herd.

2. Hog Enterprises

Two hog producers specialized in raising purebred hogs,

almost exclusively for breeding purposes. One produced, commercially, both gilts and boars, the other purebred boars. Eight hog producers specialized to varying extents in weaner pigs, four during the past ten years and four for a longer time. Eight hog producers had constructed modern hog barns with automatic grain grinding and mixing, heating, ventilating and manure handling facilities. In one operation these facilities were long-standing innovations; in seven they were recent.

In Table 14 the contrasts between the adopters and nonadopters of automated hog barns are shown. Adopters are younger (by almost five years) and have received slightly more education than nonadopters. Adopters of hog barns had considerably smaller improved acreages than nonadopters. Two adopters felt that the production of feed grain was uneconomic or conflicted with the care required in the specialized hog operation. In fact, one of the eight adopters had curtailed grain production considerably on his land and was purchasing most of his feed grain. Another was considering the sale of practically all of his cultivated land and purchasing all of his feed grain instead of growing it. While the average number of hogs owned by adopters of automated hog barns was more than double that of the nonadopters (223 to 100) the average figure for the eight specialized producers is misleading. One of the eight had marketed 1,620 hogs in 1968 but had reported only 104 hogs at the time of the study. Another specialized producer temporarily had no

TABLE 14 - ADOPTERS AND NONADOPTERS OF AUTOMATED HOG BARNS

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Acres Improved	Average Number of Hogs
Adopters	8	38.1	8.9	519	223
Nonadopters	54	43.2	8.4	693	100

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	8	63.3%	12.0%	0.0%	25.0%	0.0%	0.0%
Nonadopters	54	29.6%	12.9%	20.4%	18.5%	9.3%	9.3%

hogs to report as he was in the process of converting to a new "disease-free" system of raising weaner pigs. There is a striking relationship, as shown in Table 14, between the adoption of automated hog barns and a high level of gross income (above $20,000). It appears that high gross income may be one end product of the establishment of automated hog operations. By contrast, no specialized hog producers received the lowest levels of gross income (below $11,000) in the sample. A total of 18.6 per cent of the nonadopters of automated hog barns received the lowest levels of income. The lowest-income farmers in the sample of nonadopters raised hogs, suggesting that traditional methods of raising hogs and low income are related.

3. Diary Enterprises

In dairying, significant innovations, apart from milking machines, sanitized milking equipment, and coolers, were adopted by two operations. One operator pasteurized milk locally in order to sell milk to local townspeople. He also used a bulk tank for storing milk. Another dairyman adopted a pipeline-milking system.

III. ASSESSMENT OF THE INNOVATIONS ADOPTED

It appears clear from the foregoing characterization of agricultural innovations in the study area that relatively inexpensive innovations that can be adopted piecemeal are

more prevalent than those requiring major initial capital expenditures. The relative popularity of chemical weed sprays, commercial fertilizer or some form of crop rotation are examples of such piecemeal innovations. More expensive, or more technologically demanding, innovations which require a new managerial emphasis in farming have been accepted less often. Unquestionably, the adoption, for example, of forage harvesters, bale wagons, or modern hog barns are expensive innovations which require not only large-scale operations to justify their use but also, it appears, the prior acceptance of a modern concept of efficiency in farming.

Even though much of the previous discussion in this chapter referred to various systems in farm operations, few farmers themselves referred to systems in describing their operations and the innovations they adopted to make these systems function. Instead of describing the system they adopted, for example, a trash cover system, or a system of maximizing grain yields, they usually referred to a single innovation, a deep tillage cultivator or commercial fertilizer, respectively, as the innovations that were adopted. This may indicate that the adoption of many mechanical or other innovations is still viewed by many farmers an an end in itself and not necessarily as a means for implementing an entire system of tillage or a system of maximizing output or increasing efficiency.

The examination of personal characteristics of the adoption leaders revealed that there was no pronounced re-

lationship between age and education and the adoption or nonadoption of seven innovations consistently recommended for the area. The relative insignificance of these two personal characteristics may be partially explained by the nature of the sample. The 105 farmers were chosen primarily for their characteristics as adoption leaders. Perhaps, then, their differences in age and education were not as significant variables in their adoption practices as their personal goals, or their achievement of visible signs of success such as gross income or large improved acreages. The last two characteristics recurred often as significant differences between adopters and nonadopters of recommended innovations. High gross income was related to the adoption of specialization (primarily in beef cattle), trash cover farming, commercial fertilizer, and automated hog barns. Large improved acreages were generally related to the adoption of specialization, trash cover farming, chemical weed sprays, and commercial fertilizer. On the other hand, large improved acreages were not related to the adoption of farm business analysis or automated hog barns. It appears, then, that the major means of achieving rationalization in agriculture, and assuring high gross incomes for farmers in the study area, were the adoption of large acreages, specialization (primarily in beef cattle), trash cover farming, commercial fertilizer, and automated facilities in livestock production, as in hog specialization, for example.

If technology can be defined as "the level of knowledge

and application of crop and husbandry procedures [that is, management]",[10] it appears that some aspects of farming in the County of St. Paul are still technologically undeveloped. Most notable is the fact that only a fraction of the operators have used modern farm records and accounts, farm business analysis, performance testing or nutritional analysis of feed. More hopeful signs of technological innovativeness and agricultural adjustment in the area are reflected in the recent adoption of soil testing and modern soil management methods.

The lack of uniformity in the types of innovations adopted mirrors the differences in the goals and values of farm-adoption leaders in the County of St. Paul. It mirrors, too, varying technological or managerial competence. The extent to which it mirrors differences in physical environment as expressed in different soil types will be discussed below in Chapter VI.

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[10] J. Wolpert, "The Decision Process in Spatial Context". A.A.A.G., Vol. 54, 1964, p. 539.

CHAPTER V

INNOVATIONS PROPOSED IN THE STUDY AREA

Farmers in the County of St. Paul perceived a need for a variety of agricultural innovations or improvements in the near future. It was assumed that farm operators who proposed changes in their present practices were searching for alternative ways of reaching their goals. When few, or no changes were envisaged it was assumed that the search for alternative means of achieving farming goals had diminished for a variety of personal reasons or that the goals had been reached.

In this chapter references are made to innovations already adopted whenever comparable data about proposed innovations are discussed. While the writer recognizes that the innovations already adopted (above, Chapter IV) in the study area are probably the best indication of the types of innovations or adjustments yet to come, he also recognizes that proposed changes may indicate the further goals of the farm operators. The practices or adjustments that one operator proposes to implement may be realistic in terms of his goals or the costs his farm enterprises can bear. For another operator, proposed changes may be highly unrealistic if they are based on wishful thinking or an inaccurate perception of alternatives.

Generally, farmers in the sample thought of proposed

changes in terms of mechanical innovations and the more visible aspects of management. Few spoke of proposed innovations in terms of systems of farming. For example, a sizeable group planned to adopt a rod weeder, not necessarily as part of a weed control or trash-cover system, but as an innovation in its own right.

Many of the innovations that farmers said they intended to adopt may not be an indication of their real intentions. Many stated intentions may reflect the expectations of professional agricultural advisory personnel. For example, about one-quarter (23 of 94) of the farmers indicated that they proposed to keep better farm records and accounts, including, in most cases, farm business analysis. Many agricultural advisers have been exhorting farmers to adopt farm business analysis as an integral part of their farming systems. However, the intention of many farmers to adopt business analysis procedures may be questioned. The acceptance of business analysis appears to imply that farmers realize the value of an entire system of business analysis in their farm operations. In many cases, it appears unlikely that farmers who do not yet think in terms of systems of maximizing farm output, by adopting some of the systems described in Chapter IV, can suddenly be expected to adopt a system of farm business analysis.

In this chapter, special emphasis is placed on farm business analysis and the mass-society characteristics of adopters of farm business analysis and presumed sanction

leaders. Because about one-quarter of the adoption leaders proposed to implement a system of business analysis, it was felt that a closer examination of the personal and farm characteristics of adopters and prospective adopters was warranted. While it is true that another recommended practice, specialization, was proposed by more farmers, (thirty hoped to specialize in one type of farm animal) it was reasoned that since about one-half of the sample were already "specialized", the concept of specialization had made substantial inroads in the thinking of adoption leaders in the area. By contrast, the adoption of farm-business analysis was in its infancy and appeared to be a problem requiring closer scrutiny. Other recommended innovations that had been previously examined in Chapter IV were not examined again in terms of the personal and farm characteristics of prospective adopters and nonadopters. Many innovations that were being considered, whether they were recommended for the area or not, were proposed by very small groups of farmers or by individual farmers. Such isolated proposals, it was felt, reflected the needs of the individual operator and his operation and could not be weighted in the same fashion as recommended innovations which might ostensibly affect the entire study area.

An assessment of the extent to which each proposed innovation would prove realistic or unrealistic in terms of an individual farm operation, or the area generally, was beyond the scope of this study. Proposed innovations should

be considered as proposals only. The vantage point of the present could not serve, it was felt, as the basis for judging farming proposals in the study area for the near future. Perhaps, a subsequent study of the area would have the advantage of hindsight.

I. MAJOR INNOVATIONS PROPOSED IN MACHINERY AND EQUIPMENT

Eight farmers propose to use bigger, more powerful tractors for their tillage and seeding operations. Larger tractors will necessitate larger farm implements. Qualitatively for these farmers the tractors, tillage and seeding machinery will be the same as now, only bigger. To these farmers, increases in the size of tractors and tractor-drawn equipment appear to be innovations in themselves.

Seventeen operators were considering the use of a rod weeder (eight had previously adopted it). Eight propose using newer types of cultivators. These machines, especially cultivators, are a necessary part of a trash-cover-cropping system (above, Chapter IV, Part II, A and B).

However, four farmers planned to use larger, newer kinds of mouldboard plows (eleven are using mouldboard plows to varying extents). Their use runs counter to the desirable effects of a trash-cover system. Other tillage or seeding equipment was mentioned less often than the above equipment. The number of farmers planning to use different types of

equipment is shown in parentheses: hoe drills (2), press drill (1), larger serrated discs (2), bulk fertilizer equipment (2), and a new type of coil harrow (1).

Twenty-two farmers proposed to use a forage harvester (six had previously adopted it) as one means of changing their entire haymaking and cattle-feeding systems (see above, Chapter IV, Part II.C.). One farmer was considering the use of a front-end loader to move hay bales and stacks while another was interested in a new innovation, a hay pelleter.

A few farmers planned to adopt new grain harvesting and drying equipment. Seven planned to purchase new grain combines. A combine was an innovation for only one of these. Two farmers wished to buy new swathers. Two wished to purchase straw-cutter attachments for their combines in order to add more fibre and trash cover to their land. Another two farmers planned to buy their own grain dryers.

A variety of other mechanical innovations was being considered by farmers. Ten were considering purchasing mechanical rock pickers while two wanted mechanical root pickers. Eight wanted to buy mechanical feed mixers and two wanted mechanical grain rollers. Eight farmers planned to purchase mechanical manure spreading equipment. Seven were considering a new or improved automatic livestock watering system. Three farm operators were considering purchasing new grain handling equipment such as augers.

II. PROPOSED INNOVATIONS IN BUILDINGS

A variety of new buildings and construction was being considered for the farmsteads of early adopters in the county.

New buildings for storing farm machinery were being considered by thirteen farmers. Seven farm operators planned to construct new wooden granaries (not necessarily innovations), three planned to erect steel granaries suitable for grain drying, and two wished to erect steel granaries for grain storage only. One farmer was considering building a grain elevator. One planned to build a new hay shed. Another planned to construct a vertical silage silo — definitely an innovation for the area.

Construction innovations in the major livestock enterprises — beef cattle, dairy cattle, and hogs — for farmers in the study sample were noted. Ten beef producers reported needing new pens, corrals or cattle shelters. Eighteen operators were planning to build new or additional self feeders for their beef cattle in order to minimize labour required for feeding. Two mentioned a need to improve their present feedlots.

Two dairymen were considering building new dairy barns with automatic cleaning, heating and ventilating systems. Two others were planning to improve the ventilation systems in their dairy barns. Another dairyman proposed to build a loose-housing dairy barn.

Twelve hog producers were proposing modernization of

buildings for housing hogs. Eight were planning to build new barns but did not mention modern heating, ventilation or manure or feed handling installations. Two wished to expand the amount of space available for sheltering hogs by extending existing facilities. Neither of these two proposals can be considered innovations in that the amount of labour required in hog feeding and manure handling operations is not necessarily minimized. Twelve hog producers proposed to construct either new automated hog barns or to improve existing ones. Eight other hog producers had previously constructed modern hog barns with automatic grain grinding and mixing, heating, ventilating, and manure handling facilities. Additional features being considered in hog buildings are the following: two farmers were considering automatic feeding installations, two wanted new self feeders, and one was considering the use of modern, portable farrowing crates and pens.

The array of construction innovations described above reflects a common desire to have new facilities. More important, innovations in buildings and construction signify a desire to increase, primarily, the efficiency of livestock operations by reducing the amount of labour involved, and providing additional facilities for expanding livestock operations.

III. PROPOSED USE OF PEDIGREED SEED AND COMMERCIAL FERTILIZER

Selection of seed suitable for the short growing season in the County of St. Paul (Figure 4) is a requirement for producing mature grain crops in the area. Eighty-five farm operators responded to questions about the quality of seed grain they used (104 planted grain crops). Thirty-eight farmers indicated that they were interested in using recommended varieties of pedigreed seed on a regular basis. Another thirty-eight farmers proposed to use some pedigreed seed. Nine farm operators felt that the old, non-recommended varieties that they have used in the area for many years still constituted the best seed that could be used. Many of the non-recommended varieties of grain are unsuited to the area not only because they require a longer growing season but because they are not rust resistant or do not have the requisite milling, malting or other qualities.

Seventy-nine farm operations were using commercial fertilizer (above, Chapter IV, Part II, E, 1) to varying extents to increase productivity of their soil. No additional farmers, of the total of 104 who raised crops, expressed an interest in using commercial fertilizer. Two farm operations now using commercial fertilizer proposed the implementation of two new innovations. One hoped to fertilize hay and pasture land for the first time while another hoped to begin soil testing. Nineteen and twenty-eight farmers, res-

pectively, had already adopted these two practices to varying extents. It appears, then, that the use of fertilizer has been adopted, for the moment, by about 76 per cent (79 of 104) of the adoption leaders. It remains, now, a matter of maximizing the benefits of fertilizer use by adopting the consistent use of soil testing by all operations.

IV. PROPOSED PRACTICES IN UPGRADING LIVESTOCK

The major innovation proposed by producers of beef cattle was the introduction of imported European breeds of cattle in response to the changing emphases in carcass grading. While four beef producers had already changed to heavier, imported purebred cattle, twenty-three other farmers proposed to do so soon. Imported Charolais cattle were most commonly desired with Simmental and Brown Swiss cattle receiving fewer mentions. Twenty beef producers said they proposed a cross-breeding programme (sixteen were now practising same) in order to obtain favourable weight gains and carcass grades. The above imported breeds were proposed for cross-breeding with the present purebred cattle such as Hereford, Shorthorn or Angus. One farm operator proposed to institute a system of zero grazing for a few summer months. While zero grazing is not directly related to a system of upgrading livestock quality, it may serve as one step in an effort to maximize the livestock carrying capacity of hay and pasture land.

Only one dairyman mentioned a proposal to upgrade his

dairy herd by beginning a programme of crossing Holstein and Aryshire cattle.

Seven hog producers intend to adopt new breeds of hogs in response to a new system of grading hog carcasses. The Yorkshire breed was proposed most often as the basis for a new swine herd. Four hog producers proposed to institute a cross-breeding system using either Yorkshire, Lacombe, Landrace or Hampshire hogs in their crosses.

V. PROPOSED SCHEMES FOR LAND IMPROVEMENT

Various means of increasing soil productivity, improving rough pastures, improving drainage, and preventing soil erosion were suggested by a few farmers in the study sample. Five farmers were considering irrigation as one means of maximizing output on land, four in the vicinity of the North Saskatchewan River and one near a lake. No major irrigation schemes are present in or near the County of St. Paul. As yet, none of these farmers had carried out irrigation feasibility studies. Three farmers were considering the use of chemicals to destroy shrubs on rough pasture in order to increase the grazing capability of their land. Only one had experimented, on a limited basis, with chemical means of controlling shrub growth. Two farmers were planning to construct drainage ditches to make arable land usable especially during wet seasons. One farmer was planning to extend his shelter belts in order to prevent possible erosion of

his soil.

VI. PROPOSED MANAGEMENT CHANGES

The adoption leaders in the County of St. Paul suggested ways in which they would change their farm management to make their farm operations function more efficiently. They also cited reasons for proposing the management changes or the reasons for making no management changes whatever. In order to allow farm operators an opportunity to verbalize their perceptions of desirable management changes, no definition of management was offered to them. It was reasoned that their responses would in this way be much less biased and would reveal their true perceptoins regarding desirable farm managerial changes.

In general, slightly more than half of the ninety-five farmers who proposed various managerial changes cited one way in which they might improve their farm management. Most of the remainder cited two ways. Ten farmers in the sample of 105 could envisage no managerial changes.

A. Keeping Better Farm Records and Accounts

Twenty-three farm operators proposed to keep better farm records and accounts. Eleven farm operations were previously judged to be keeping good farm records and accounts because they had adopted farm business analysis (above, Chapter IV, Part I, A.). Nineteen farmers of these twenty

three said they wished to have better means of showing profits and losses and a statement of net worth. Nine felt that better farm records and business analysis of the farm operation would allow them to become more efficient farm managers. Two felt that good record keeping was an essential step in computerizing their farm management. One felt that it was desirable to just keep records of farm production.

1. Comparison of Adopters, Prospective Adopters, and Nonadopters of Farm Records and Accounts

In Table 15, adopters, prospective adopters and nonadopters of farm records and accounts are compared. Data on the adopters were obtained from Table 8 (above, Chapter IV, Part I.A.). Even though Table 8 dealt with farm business analysis, the data in Table 8 were combined with "farm records and accounts" in Table 15. In essence, farm business analysis may be the end result of keeping good farm records and accounts. Farm business analysis could also be viewed as the highest level of farm record keeping and accounting. Prospective adopters spoke of "keeping better records" or "keeping better accounts". Since they had not adopted farm business analysis they could not be expected to refer to it by name.

Adopters of farm records and accounts were somewhat older than prospective adopters or nonadopters. Average school grades completed by adopters and by prospective adopters were identical but nonadopters had slightly less formal educa-

TABLE 15 - ADOPTERS, PROSPECTIVE ADOPTERS, AND NONADOPTERS OF FARM RECORDS AND ACCOUNTS

	Number	Average Age	Average Grade	Average Acres Improved	Specialized in: Beef Cattle	Hogs	Grain	Bees	Mixed Farming
Adopters	11	46.1	9.0	671	18.2%	9.1%	9.1%	0.0%	63.6%
Prospective Adopters	23	42.0	9.0	770	34.8%	8.7%	4.3%	0.0%	52.2%
Nonadopters	71	42.9	8.6	815	28.2%	8.2%	8.2%	1.4%	54.0%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters	11	27.2%	36.4%	0.0%	18.2%	18.2%	0.0%
Prospective Adopters	22	36.4%	22.7%	9.1%	27.2%	0.0%	4.6%
Nonadopters	71	49.3%	5.6%	15.5%	14.1%	9.9%	5.6%

tion. It appears anomalous that prospective adopters and nonadopters should have larger farm operations (measured in acres of improved land) than adopters of farm business analysis and still have no sound business analysis of their operations. As indicated previously in Chapter IV, high gross income and large farm size may have been, in the past, sufficient evidence of farm-business success for nonadopters. Table 15 reveals, as did Table 8, that a larger per cent of nonadopters achieve the highest level of income (above $20,000).

An examination of the composition of the group of adopters and nonadopters reveals that no presumed sanction leaders had adopted records. However, four of the nine presumed sanction leaders are proposing the adoption of better farm records and accounts. This may indicate that the presumed sanction leaders may have realized the value of keeping better farm records and accounts or of adopting farm business analysis. If these leaders do in fact adopt better farm records and farm accounting, they may create a more favourable attitude toward business procedures in farming. Spatially, the impact of adoption by the presumed sanction leaders may be far-reaching in the County of St. Paul. It appears significant that two of these leaders, one of whom is the prime adoption leader (Figure 9) are strategically located in the St. Paul information-seeking network while two are in the Elk Point network (Figure 8). On the other hand, the impact of the eleven farmers who have adopted

farm business analysis may be minimal. Spatially, these eleven farmers are dispersed throughout the county. There was no interaction between any of them, suggesting that they adopted farm business analysis independent of other farmers in the sample.

2. Mass Society Status

Previously, (Chapter III, Part I.B.), mass society status was defined as the degree to which a community has adopted an outward orientation or has become cosmopolitan in outlook. Magazine subscriptions were used as one index of mass society status. In Table 16, personal and farm characteristics, gross income, and six indices of mass society status are used to compare the adopters of farm business analysis and the presumed sanction leaders. These two groups of adoption leaders were compared because one of the major anomalies of this study appeared to be the nonadoption of farm business analysis by the group of nine farmers considered locally to be quite successful farm operators, and presumed to be sanction leaders. Four presumed sanction leaders proposed to adopt farm business analysis in the near future. If they do adopt farm business analysis, their legitimation of this system may prove to be salutary in the study area and may markedly affect the spatial pattern of business analysis adoption. This is because two presumed sanction leaders are located in the St. Paul information-seeking network and two are in the Elk Point network.

TABLE 16 - MASS SOCIETY STATUS: COMPARISON OF THE CHARACTERISTICS OF ADOPTERS OF FARM BUSINESS ANALYSIS AND THE PRESUMED SANCTION LEADERS

Personal and Farm Characteristics

	Number	Average Age	Average Grade	Average Years of Additional Education	Average Improved Acres
Adopters of Farm Business Analysis	11	46.1	9.0	.72	671
Presumed Sanction Leaders	9	48.6	8.7	.88	1131

Factors in Mass Society Status

	Number	Average Number of Magazine Subscriptions	Average Number of Information Sources Outside County	Average Number of Memberships in External Agricultural Organizations*	Average Number of External Agricultural Events Attended**	Per Cent Belonging to a Chamber of Commerce
Adopters of Farm Business Analysis	11	6.72	1.45	.36	1.18	27.3%
Presumed Sanction Leaders	9	5.55	2.66	.33	1.22	44.4%

Gross Income
(in thousands of dollars)

	Number	above 20	17-20	14-17	11-14	8-11	below 8
Adopters of Farm Business Analysis	11	27.2%	36.4%	0.0%	18.2%	18.2%	0.0%
Presumed Sanction Leaders	9	88.9%	0.0%	0.0%	11.1%	0.0%	0.0%

* "External" refers to organizations or events located outside the County of St. Paul.
** During the two years prior to the study.

In Table 16 the major difference, in personal and farm characteristics, between adopters of business analysis and the presumed sanction leaders, is in the much larger average improved acreages utilized by presumed sanction leaders (1131 to 671). Large farm size alone may denote visible farm success, innovativeness, and reliable opinion leadership. The adopters of business analysis, because they have not achieved the visible signs of success, farm size mainly, may not be shown the same deference locally as the presumed sanction leaders. As well, local norms may serve to resist the adoption of certain mass society practices such as farm business analysis. The adopters of farm business analysis appear to be the real innovators in adopting business procedures in farming but the effects of their adoption may be too intangible to be appreciated by many other farmers. Higher gross incomes and presumably more conspicuous spending exhibited by presumed sanction leaders may serve as another index of perceptible farming success.

In Table 16, adopters and presumed sanction leaders do not vary considerably in four indices of mass society status: magazine subscriptions, utilization of external information sources, membership in external agricultural organizations, and attendance at external agricultural events. The main difference between the two groups is in the degree of membership in the Chamber of Commerce. The presumed sanction leaders are more involved in this organization. They may be more involved because their status may be con-

sidered equal to that of nonfarmers in the organization. Adopters of farm business analysis may not have achieved the same status since their gross incomes are only verging on those of the presumed sanction leaders and their smaller farm sizes do not mark them as the upper level of "successful farm businessmen". Keeping records, following a system similar to that of nonfarm members of the Chamber of Commerce, may be a lesser consideration than tangible evidence of farm success in their mass society status.

B. Changing the Form of Farm Management

Nine farm operators proposed to change the form of their present farm management. Four indicated that a partnership would allow each of the farming partners to specialize in certain farm enterprises. Two said that a partnership would make it possible for their sons to get started in farming. Three felt that a family corporation farm would encourage participating family members to become more involved in the management of the farm. A family corporation farm, they indicated, might have greater access to more potential sources of family capital as family involvement increased.

C. Obtaining More Capital or Credit

Four farm operators indicated that better farm management was dependent upon the availability of more capital or credit. Two suggested that additional capital was required to either establish the kinds of operations they wished to

have or expand their existing operations. Two felt that additional credit would allow them to become more efficient by reducing the unit costs in their farm specialization. One farmer felt that additional capital would allow him to diversify his farming.

D. Maximizing Production on Present Acreage

Eleven farm operators felt that their farm management would improve if they strove to obtain maximum output from their existing acreage. Four of these indicated that maximum output could be obtained through the adoption of a good crop-rotation system. Four felt that maximization was contingent upon the adoption of a system of performance testing of livestock. (Nine farmers had already adopted some form of performance testing). Three farm operators felt that maximum output could be obtained by cropping their land continuously, leaving no land in summerfallow. For these three, fertilizer use based on soil testing would be the way of achieving their goal. Two farmers did not suggest how maximization could be achieved.

E. Planning

Three farm operators proposed that planning on a long term basis was the best way of improving their management. They felt that sound management entailed taking the long view of farming so that a farm manager would be prepared for many eventualities in agriculture. One felt that planning

would help him to become a more efficient farmer.

F. Specializing or Diversifying

Thirty farm operators felt that specialization in one farm enterprise was the best proposal for improving farm management. Although thirty suggested specialization, only twenty-two indicated which livestock or poultry specialty they were interested in. Twelve suggested feedlot finishing of beef cattle, seven preferred specialization in hogs, one specialization in dairying, one in raising field crops, and one proposed specializing in producing hatching eggs.

The reasons cited for specializing were three in number: (1) Twenty-three operators indicated that specialization would reduce their unit costs and increase their efficiency or profits, (2) Seventeen operators said that specialization would allow them to concentrate their capital and labour in one activity and prevent them from spreading their resources too thinly over many enterprises, as was the case now, and (3) Twelve farm operators felt that specialization would be one means by which a farm operator would keep abreast of new knowledge or changing technology, and marketing in his specialty. Reasons 1 and 2 above are essentially the same.

Only one farmer felt that diversifying his farming enterprises would help his farm management. He suggested two reasons for mixed farming being desirable: The County of St. Paul was basically a mixed farming area, and versatility

in farming involved less risk than specialization.

G. Expanding or Reducing Scale of Operation

Ten farm operators felt that expanding the scale of their farm operations would be the best way to improve farm management. The reasons cited for expansion by six of these farmers appeared to indicate that expansion just for the sake of expansion was desirable. Proposed expansion meant, literally, more livestock, more land, more and bigger farm machinery. Another reason for expansion, mentioned three times, was that unit costs would be reduced and farmers would thus be better able to compete favourably with modern, efficient operations elsewhere. Expansion, for one farmer, was a means of encouraging his son to remain in farming. Another farmer was not certain why expansion was desirable even though it was his personal goal.

By contrast, three farm operators felt that reducing the scale of their farm operation would improve their farm management. Impending retirement or the sale of the farm operation was mentioned three times as a reason for reducing the scale of farm operations. Combined with these reasons were three others: failing health, advanced age, and the lack of reliable hired help or no prospects for a successor to manage the farm.

H. Obtaining Successors or Hired Help

While one farmer, in the previous section, felt that

he would be forced to reduce the scale of his farm operation if neither a successor nor a hired man could be obtained, four farmers felt that a suitable successor would assure an improvement in their farm management without limiting the scale of their farm operations. For these four farmers, obtaining a suitable successor (that is, a son or son-in-law) was proposed as the means by which the farm operation would remain within family control.

Six farm operators felt that farm management would be improved with good hired help. Four believed that, in essence, "a good hired man makes a farm go". Two stated that management would improve if relatively difficult physical work was apportioned among two or more people.

I. Improving Management Through the Use of Machinery or Equipment

Twenty-six farm operators felt that the use of machinery or equipment that would, to some extent, mechanize or automate more farm operations was the best means of improving farm management. Eleven felt that better machines would reduce time and labour, and unit costs, in farm operations. Seven felt that greater reliance on modern machinery or equipment was a way of avoiding reliance on scarce hired help. Mechanization and automation, they said, would improve management if the farm became a "one-man operation". Seven indicated that the use of machinery and equipment was essential in mechanizing or automating some aspect of their

farm operation. Four felt that mechanizing their forage storage and feeding operations was a way of improving management. Specifically, they felt that making and feeding silage, instead of hay, was a way of not only reducing drudgery but also improving the quality of livestock feed (hence improving management). Three proposed the cooperative purchase and use of farm machinery as a way of improving farm management. Two felt that using bigger machines was synonymous with improving farm management. They did not elaborate in what ways bigness in machinery and sound management could be interdependent.

J. Other Responses

Ten farm operators envisaged no changes in their farm management. As a group, they suggested three reasons for proposing no changes. Three said they could not see any ways in which to improve their management. Two said that because of unfavourable prices no managerial changes were warranted in the near future. One said no managerial changes were necessary as he was hoping to sell his farm operation. One gave no reasons for proposing no managerial changes. He appeared to be puzzled by the question of management. Three farm operators said they were satisfied with their present management.

Four farmers gave other reasons or proposals regarding their farm management. One said he would reduce his dependence on wheat as a source of farm income as wheat marketing had

become too risky in recent years. One felt he would have to erect farm buildings in order to retain good hired help since he had only granaries on his land. One proposed to reduce his involvement in outside interests and concentrate more on farming in order to improve his management. Another farmer felt that farmers could not change their farm management because farming "depended on the weather".

VII. ASSESSMENT OF PROPOSED INNOVATIONS

The foregoing characterization of proposed innovations in the study area reveals that farm operators intend to implement changes, or no changes whatever, for a variety of reasons, some personal and some based on rational economic or managerial considerations. While, in theory, the proposals for changes in agricultural practices may appear to foretell the types of farming adjustments that may be implemented and the future agricultural patterns in the County of St. Paul, in practice many of the proposals or plans may not materialize.

It is noteworthy that many of the proposed innovations, no matter how commonplace they may appear to be in more progressive farm operations, are truly innovations for most of the study area. For example, modern record keeping and farm business analysis, a wholesale conversion to a new system of handling forage or maximizing output on existing acreage, specialization, long-term planning, or an automated

system of raising livestock are innovations in an entire system of farming. For those farmers who propose to adopt innovations in order to improve or change a system of farming, proposed innovations involve much more than the simple purchase of new machinery, equipment or livestock, or the desire to simply expand the scale of the farm operation by acquiring more land, livestock, machinery or hired help.

Those farmers in the County of St. Paul who can visualize an entire system or concept of farming are more likely, it appears, to make the types of managerial decisions that take into consideration more variables in their farm operations. The farmers who assume that acquiring isolated innovations is a qualitative departure from their existing farm management may not be able to make the requisite adjustments in order to double farm output in the area, as proposed by The B-12 Plan.

CHAPTER VI

TESTING THE HYPOTHESIS

The hypothesis proposed for this study stated: Farm operators farming predominantly grey-wooded soils have adopted agricultural adjustments or innovations that differ from the agricultural adjustments or innovations adopted by farmers farming predominantly black soils. This hypothesis was proposed because considerable emphasis has been laid, primarily by the Alberta Department of Agriculture, on the desirability of adopting qualitatively different practices in farming on different soils.

In selecting a sample of farmers to test the hypothesis, a few subjective considerations had to be employed. Because virtually all farmers in the study sample described their soils in terms of two distinguishing colour characteristics — grey and black — it was decided that the farmers' estimates of the amount of each type of soil farmed would be used. Although the preliminary soil survey of the area (Figure 2) provided a more accurate picture of the distribution of major soil groups in the county, it was difficult to use this as a basis for estimating the amount and the location of cultivated land farmed by each farmer in the sample. However, as a rough check on the farmers' estimates of the amount of cultivated land in grey or black soil, Figure 2 was useful when used in conjunction with a land

ownership map of the County of St. Paul. Farmers generally described eluviated black and black soils as "light black" or "black", respectively. Grey wooded, dark grey wooded, or dark grey chernozem soils were generally described as "grey" soils, although, occasionally, the description of soils located in the transition zones between grey and black presented some difficulty to farmers. Where this difficulty arose, the farmer was not included in the sample for testing the hypothesis.

Farmers who cultivated over seventy-five per cent of either grey or blacksoils were considered for inclusion in the sample. Forty-one farmers were considered to be farming predominantly grey soils and twenty-two to be farming predominantly black soils. In order to equalize the sample of farmers on grey and black soil, twenty-two from the group of forty-one farmers on grey soil were selected randomly, leaving two groups of twenty-two farmers.

Table 17 shows which practices have been adopted by the twenty-two farmers farming each soil type. The data in the table were derived from information used previously in Chapter IV. In order to determine the statistical significance of the frequencies shown for each soil type, the chi-squared (x^2) test was used. In the formula $x^2 = \sum \frac{(O-E)^2}{E}$, the observed frequencies (O) were those shown in the grey-soil column in the table. Expected frequencies (E) were those shown in the black-soil column.

TABLE 17 - INNOVATIONS ADOPTED ON GREY AND BLACK SOIL

	Soil Type	
Overall Management	Grey	Black
Rudimentary Records and Accounts	20	17
Records Showing Analysis	2	3
No Records and Accounts	0	2
Performance Testing	2	2
Nutritional Analysis of Feed	1	1
Specialization[1] in Beef Cattle	5	3
Specialization in Dairying	0	0
Specialization in Hogs	4	4
Grain Production Exclusively*	1	5
Tillage and Sowing		
Trash Cover	18	19
Mouldboard Plow***	6	1
Press Drill*	4	10
Hoe Drill**	1	6
Weed Control		
Chemical Weed Spray	14	16
Summerfallow	13	13
Systematic Rotation	9	6
Rod Weeder	1	3
Haymaking		
Hay Baler	13	10
Forage Harvester	1	0

	Soil Type	
Grain Harvesting and Drying	Grey	Black
Swather and Combine	21	21
Binder and Threshing Machine	1	1
Grain Dryer	3	5
Maintaining Soil Productivity		
Commercial Fertilizer	17	20
Soil Tests	9	6
Commercial Fertilizer to Forage Crops	6	5
Systematic Rotation	9	6
Periodic Rotation	7	4
Green Manure	0	1
Summerfallow	12	13
Barnyard Manure (Major Applications)	2	1
Livestock Enterprises		
Purebred Beef Cattle	3	4
Cross Breeding Beef Cattle	3	1
Heavier, Imported Beef Breeds	0	1
Purebred Hogs	2	0
Weaner Pigs	2	2
Modern Hog Barns	2	4
Pipeline Milking and Bulk Tank	0	1

[1] Defined as the production of only one kind of farm animal in addition to grain and fodder.
* Significant difference at the .10 level; ** Significant difference at the .05 level;
*** Significant difference at the .001 level.

In large measure, the results of the chi-squared test statistically refute the hypothesis. Only four innovations, of those shown in Table 17, proved significant at a high, or reasonably high level, statistically speaking. The use of the mouldboard plow on grey-wooded soil was significant at the .001 level. The use of the hoe drill was significant at the .05 level. The exclusive production of grain, and the use of the press drill were significant at the .10 level.

The above results appear to indicate that the rate of innovation is not significantly different for farm operators farming grey or black soil in the County of St. Paul. An explanation for the persistence in the use of the mouldboard plow on grey-wooded soils appears to be the presence of more stones in grey-wooded areas and the inherent characteristics of grey-wooded soils. Some farmers indicated that mouldboard plows were more effective in plowing old grassland on grey wooded soils, especially on stony fields, than more recent innovations such as deep tillage and various other cultivators. Good tilth in preparing a seedbed is often difficult on grey-wooded soils that also usually have a higher density of stones in the topsoil than black soils. Additionally, because grey-wooded soils have poor soil structure and tend to pack readily if undisturbed by cultivation, some farmers feel that more is gained in terms of moisture conservation if deeper cultivation is carried out by the mouldboard plow. Moisture penetration or conservation is especially important on rolling land (grey soils and

rolling land usually coincide in the county). Some farmers said that recent innovations like cultivators could not penetrate the grey-wooded, stony soils to the same depth as mouldboard plows.

It must be recognized, however, that even on black soil some farmers in the County of St. Paul found that they could not complete the task of preparing a seedbed on grassland in one operation with a deep tillage cultivator. Despite the more favourable conditions of less stone and easier cultivation on black soils, even farmers on these soils practised repeated cultivations before old hayfields or grassland were ready for subsequent seeding. It may be that a local norm, regulating the tillage practices in the area, persuades farmers, especially those on grey-wooded soils, that in preparing a seedbed on long-untilled or stony land only one major tillage operation is necessary. This tillage, the norm probably indicates, is best brought about by the use of the mouldboard plow.

The greater use of the press drill and hoe drill on black soil appears to be related to the presence of fewer stones in this soil. While those farmers on black soil, who adopted either of these innovations, praised their effectiveness, others on grey soil were reluctant to invest in these relatively expensive innovations because of the reported, or observed, damage that was done to these machines by their passage over stony soil. It is true that stony land can damage both of these sowing implements and cause delays in

seeding on grey-wooded soils. However, the farmers who did use either the press drill or hoe drill on grey soils indicated that the reluctance of their neighbors to use either machine was related more to the cost of the machines and insufficient evidence about the actual extent of damage caused to the machines by stones.

The reasons for the relative importance of specializing in the production of grain on black soils are varied. The high natural fertility of black soils, when contrasted with grey-wooded soils, has served to mark the black-soil areas, historically, as the local "grain-growing" areas. The attractiveness of growing grain on fertile black soils, before the introduction of commercial fertilizers suited to all arable soils, has enhanced their appeal as the producers of grain. The inherent fertility of black soil in the area is only one factor, however. The frost hazard to agriculture in the area (Figure 4 and Figure 5) shatters, in part, the myth of productive black soils. An average frost-free period of eighty days or less (Figure 4), is unlikely to assist during most years in the proper maturing of grain, irrespective of soil fertility. That the myth of unlimited fertility of the black soils persists is evidenced by the long-standing practice of sowing wheat in large areas of the black-soil zones in the county, even though earlier maturing barley, grasses and legumes fare better. The black soils in the County of St. Paul, with their accompanying favourable topography (Figure 3) and the general absence of burdensome stony

areas have had a high appeal for grain production, especially mechanized grain production. In part, then, the ease with which black soils could be tilled and sown has made them the more favoured areas in the County of St. Paul for adopting innovations such as the hoe drill or press drill, to mention only two relatively significant innovations, statistically speaking.

The chi-squared test revealed that only four innovations showed statistical significance. Two of these, grain farming and the use of the mouldboard plow, might be considered risky or non-recommended, respectively. (The writer recognizes that many practices or innovations shown in Table 17 are not necessarily related to soil type: factors of management, haymaking, grain harvesting and drying, or innovations in livestock enterprises). However, it is noteworthy (even though not statistically significant) that in weed control practices, the recommended practice of rotating legumes and grasses with grain has been adopted by more farmers on grey than on black soil. A more recent innovation, the rod weeder, has begun to gain greater acceptance by farmers on black soil. Soil testing, a significant innovation of the past few years in the county, appears to be accepted more by farmers on grey soil because it is a useful innovation for maximizing output on this soil.

The significance of differences in practices, relating to variations in soil type in the county, must still be examined on logical grounds and on grounds of the desirabil-

ity of the innovations *per se*. Whether the adoption of certain practices proved to be statistically significant or not is another matter.

In assessing the significance of the difference in innovations adopted on different soils, another influence may be operating. Since few innovations proved to be statistically significant this may be an indication that social pressures within the county and the network of information-seeking relationships (above, Chapter III) serve as a powerful force in bringing about uniformity in farming practices. In fact, the social pressures to adopt similar practices or innovations, irrespective of soil differences, may come to bear more on the early adopters of innovations than the farmers who lag behind them and who participate less socially. Social pressures within the elitist group of adoption leaders in the County of St. Paul may act to sanction the adoption of desirable, recommended, innovations or cause outdated innovations to persist. It is even conceivable that the entry of individual farmers into the elitist group of adoption leaders in the farming communities in the county may hinge on social acceptance by the existing elite farmers. Social pressures may account for the adoption or rejection of more innovations than is commonly recognized.

Although it is possible only to suggest ways in which social pressures act to promote, or hinder, the adoption of innovations in the County of St. Paul, it is clear, statistically, that the hypothesis, "that farmers on grey-

wooded soils have adopted different innovations or adjustments than those on black soils", is invalid.

CHAPTER VII

SUMMARY AND CONCLUSIONS

In this study we have examined selected personal and farm characteristics, the communication patterns and the social participation of farmers in the County of St. Paul who were considered to be leaders in adopting recommended agricultural innovations. These adoption leaders were farmers who appeared to be making the requisite adjustments in farm management or farming practices in order to achieve the goal of doubling production on existing farms, as proposed by The B-12 Plan for the area.

Within the group of 105 adoption leaders nine farmers who were regarded by the others as important local sources of information could be isolated. Many of these nine had adopted most of the innovations which professional advisers had proposed for the area. Several of the nine had been called upon by these same advisers to address local farmers' meetings; most had executive experience in local organizations and can reasonably be regarded as sanction leaders within the farming communities in the County of St. Paul.

Amongst the adoption leaders as a whole, the personal characteristics of age and education were only slightly related to the adoption or nonadoption of recommended agricultural innovations. However, even within the group of adoption leaders differences existed in the value ascribed to education for the offspring of adoption leaders and to

prospective farmers in the area. Farmers with relatively high education perceived a greater need for higher education and more specialized training for their offspring and for future farmers than did farmers who had themselves attained a lower level of education.

Adoption leaders in the County of St. Paul appear to have higher mass society status than the general farm population in Census Division 12. Most of the interaction between adoption leaders and other farmers or non-farmers occurred locally. Only a minority of farmers participated in formally structured external agricultural organizations. This may indicate that interpersonal, informal contacts between local farmers are the important avenues for diffusing information about innovations. The presumed sanction leaders were more involved in Chamber of Commerce activities and interacted more with non-farm people than the remaining farmers in the sample.

The local networks of information-seeking relationships exhibit a spatial configuration in which the dominance of the St. Paul farming community, centered on the town of St. Paul, is prominent. The Elk Point farming community is a secondary center of innovation for the county. The nine presumed sanction leaders are strategically located within the St. Paul and Elk Point communications networks and constitute a disproportionate share of the opinion leadership or legitimation relating to farm innovations. Spatially, the intensity of information-seeking contacts drops off

sharply as distance from the dominant centers and presumed sanction leaders increases.

Edmonton and Vermilion dominate the spatial pattern of external information-seeking contacts established with other areas in Alberta by the adoption leaders. Important institutional and commercial information sources, and other farmers, are available in or near these centers. Information sources in other parts of Canada or in foreign countries were utilized by only a small fraction of adoption leaders.

The adoption leaders utilize a disproportionate share of the improved and unimproved land in the county and produce a disproportionate share of the livestock. These signs of achievement, more than any others, appear to mark them as adoption leaders and outstanding local farmers. The study sample, which comprises about eight per cent of all farmers in the county, utilizes about one quarter of the total cultivated acreage in the county. The adoption leaders also produce about four times their proportionate share of beef cattle, dairy cattle and hogs. However, about half of the adoption leaders have not achieved the visible signs of innovativeness and success as they utilize only a section or less of improved land. The sixteen largest operations, which utilize roughly two sections or more of cultivated land, appear to foretell the kinds of operations that may evolve in the area, if economic viability or rationalization in agriculture become the goal of the most innovative farmers in the area. The majority of these large operations are

specialized, primarily in the production of beef cattle, and secondarily in the production of grain or hogs.

Because the adoption leaders utilize a disproportionate share of the improved land in the county and because they now produce a disproportionate share of the livestock in the county, it is likely that they will contribute significantly to the doubling of production in the whole county as called for in The B-12 Plan.

The extensive pattern of cultivation will probably persist in the area because even some of the more innovative farmers have apparently never felt themselves compelled to maximize output per acre on their existing cultivated area because additional land for cultivation has been relatively easy to obtain. The prospect of few family replacements for the existing adoption leaders may result in a decline of the farm-labour force and will probably allow the extensive pattern of farming to persist. About two-thirds of the sample indicated that expansion, often for the sake of expansion, was the most desirable way of achieving viability in farming while about one-quarter indicated that maximization of output on existing farms was a desirable means of attaining viability in farming. The preponderance of farmers who feel that mere expansion in acreage and the number of livestock produced is desirable, adds credence to the expectation that the extensive pattern of land utilization will continue for the foreseeable future. This pattern may persist despite the efforts of agricultural advisers to en-

courage farmers to maximize output per acre and to strive for efficiency in farm operations.

The majority of adoption leaders in the study area have adopted many of the innovations consistently proposed for the area but have lagged in the adoption of systems of business analysis. Few appeared to think of their farming operations in terms of systems of maximizing output. Often, mechanical innovations were adopted as ends in themselves and not necessarily as part of a system of tillage, weed control, crop rotation or management. The high gross incomes received by the adoption leaders were interdependent with the adoption of some degree of specialization (usually in beef cattle), a trash cover system, commercial fertilizer, or automated hog barns. Similarly, large improved acreages were interdependent with the adoption of such innovations as specialization in raising one type of farm animal or grain, a trash cover system, chemical weed sprays and commercial fertilizer.

A significant anomaly in the study was the nonadoption of farm business analysis by farmers on the largest operations, which were considered locally to be symbols of farming success. Several explanations for the high nonadoption of business procedures were suggested. Two characteristics, large farm size and high gross income appear to mark nonadopters as successful farm businessmen. The adopters of farm business analysis, on the other hand, do not appear to be shown the same deference locally as nonadopters (in-

cluding all of the presumed sanction leaders). Less deference appears to be shown adopters because their farm sizes are smaller and their gross incomes are lower than those of nonadopters. In other words, they have achieved less tangible evidence of farm-business success than nonadopters. The effects of the adoption of farm business analysis may appear to be too intangible to be appreciated by the majority of adoption leaders. Equally, even the majority of adopters of business analysis may not appreciate the effect of business procedures in their farm operations because the majority of them have been compelled to keep good records and accounts by money lending institutions to which they are indebted.

Very few significant statistical differences in the kinds of innovations adopted by those who farm predominantly grey-wooded as compared with predominantly black soils were found in the study. Local social pressures, exerted on adoption leaders, to conform to the expectations of their fellow adoption leaders appear to result in considerable uniformity in farming practices, irrespective of soil type. The rate of innovation is not significantly different between farm operators on predominantly grey and those on predominantly black soils.

In proposing the adoption of innovations in the near future, few adoption leaders related specific innovations to their entire system of farming or to their farming goals. Certain proposed innovations, such as farm business analysis, appeared to mirror the goals of professional agricultural

advisers and not necessarily those of the adoption leaders. However, hopeful signs of successful agricultural adjustment in the study area are reflected in the involvement of a few of the presumed sanction leaders in fostering business procedures in agriculture in the year since the fieldwork for the present study was carried out. Other hopeful signs include the desire of adoption leaders to become more specialized and automated in their livestock enterprises.

It appears, on the basis of evidence from the present study, that innovation is a major mechanism of social and economic change in agriculture in the County of St. Paul. The B-12 Plan appears to have set a realistic target of doubling production on existing farms in the area. Production could be doubled by expanding the improved acreages in the area. However, expansion does not always appear to be preceeded by the prior adoption of a philosophy or system of farming which stresses maximization and efficiency in the operations of the adoption leaders.

The past performance of adoption leaders is probably the best indicator of the types of agricultural adjustments or innovations that they will adopt in the near future. This expectation appears realistic because those adoption leaders who have already adopted innovations in a variety of farm operations and systems appear most likely to adopt additional innovations.

A qualitative change in farm management and an orientation toward business practices by adoption leaders appears

to be a prerequisite to the establishment of more viable farming enterprises in the area. The major means of achieving rationalization in agriculture in the area, and assuring high incomes for adoption leaders, appears to be the adoption of systems of maximizing output on existing acreages, the adoption of innovations for maximizing output and profits in livestock specialties, and the use of commercial fertilizer, crop rotation, and trash cover.

The technological capability for doubling production on farms in the County of St. Paul exists. However, the art of applying this technology in the area appears somewhat undeveloped. Heightened awareness of the alternative ways of achieving maximum productivity is developing among the adoption leaders in the County of St. Paul. Awareness, however, is only one aspect of the problem. The adoption of agricultural innovations to facilitate the achievement of maximization, both as a managerial philosophy and as an end in itself, is a matter requiring attention by professional agricultural advisers and by adoption leaders.

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APPENDIX

QUESTIONNAIRE

(CONFIDENTIAL)

AGRICULTURAL INNOVATIONS, COUNTY OF ST. PAUL

I. PERSONAL

Name of Operator - Date -

Quarter Section of Residence -

Full-Time Operator (yes, no) - If "no", other work during past year:

Age of Operator(s):

Size of Your Farm (in acres)		Number of Livestock (all ages taken together)	
Acres Improved	_____	Cattle	_____
Acres Unimproved	_____	Swine	_____
Land Owned	_____	Poultry	_____
Land Rented	_____	Other	_____
Total Acres	_____		

Education of Operator(s):

Years of Formal Education (Grade Completed): _____

Any Post-Public School Education? (yes, no), Where? _____
No. of Years: _____

Attendance at a School of Agriculture? (yes, no),
No. of Years: _____

Education of Children:

Sons or Daughters Attending (Attended) a School of Agriculture? (yes, no) - Names of Children:
Years Attended:

Interested in Attending a School of Agriculture? (yes, no)
Names of Children:

Interested in Going to University to Study Agriculture? (yes, no)
Names of Children:

Training (completed or proposed) in Other Fields
Names of Children:

II. DESCRIPTION OF SOIL TYPE(S):

Fraction or Per Cent of Each Soil Type in Total Improved Acreage:

DESCRIPTION OF TOPOGRAPHY:

III. COMMUNICATION AND SOCIAL PARTICIPATION

COMMUNICATION

A. Do you feel you gain more useful information for your operation from:

Local people such as friends or neighbors? (yes, no)

or

From other sources such as farm magazines, government publications, radio and T.V. programs, etc. that originate outside this area? (yes, no)

Why is this so?

B. From which sources (magazines, farm publications, non-farming personnel, etc.) do you personally obtain new ideas in farming to help your operation?

Which publications or magazines?

Which non-farming or agricultural service personnel?

C. Which farmer or farmers personally give you the best or most useful new ideas, suggestions or advice about farming?

Name(s)	Located Where?	No. of Miles Away	Neighbor?

D. Do you request information or personally obtain information from outside this area?

Request (yes, no)	Where?	How? (letter, phone, other)
Personally Obtain (yes, no)	Where?	How?

SOCIAL PARTICIPATION

A. Which local organizations or clubs do you think are most helpful in providing local farmers an opportunity to discuss and exchange new ideas, suggestions, or advice about farming?

B. To which farmers' organizations or clubs do you belong?

Local:
Outside:

C. Which of these organizations or clubs is most helpful in providing you with new ideas for improving your own operation? Why?

D. How often do you attend the meetings of the local organization or club to which you belong? What positions do you hold in them?

Name of Organization or Club	Position (member only, executive, committee member)	Attendance (little or no, occasional, regular)

E. Have you attended workshops, meetings, or participated in field days or agricultural demonstrations outside this area?

F. Do you attend short courses, workshops, meeting, or participate in extension work in this area? (During last two years).

Sponsor	Event	Where?

G. Do you feel you gain more useful farm information from participating in local or in outside organizations? Why?

IV. GROSS INCOME (farm and off-farm, in thousands of dollars)

3 and below, 3-5, 5-8, 8-11, 11-14, 14-17, 17-20, 20 and above.

V. INNOVATIONS

A. To improve or change your operation what new ideas or things would you consider in each of these:

Machinery and Equipment:
Buildings and Construction:
Seed and Fertilizer Supplies:
Livestock:
Land Improvement:

B. What changes have you brought about in your farm operations during these two time periods (if applicable):

Recently (roughly 1959 to 1969):
Long Ago (roughly 1939 to 1959):

C. How could you change the management of your operation to make it still better?

Why would it be to your advantage to do so?

VI. MISCELLANEOUS

A. For respondents under 60 years: Could you manage your present (or anticipated) size of operation when you become 60 or 65 years old? (yes, no, not certain). Why?

B. How much education do you think the average farmer in this area will need in the next 10 to 20 years? Why?

C. How big an operation do you think a farm operator should have (or will need to have) in the next 10 to 20 years in order to be a modern farmer?

No. of acres of cultivated land: _____ Why?
No. of head of livestock: _____ Why?
Kind of livestock:

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